AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING
ARM AIR HEATING • SHEET METAL CONTRACTING

OCTOBER
1939

TABLISHED
8 8 0

LAMNECK SERIES 700 SYSTEM PREFABRICATED DUCT AND FITTINGS

PREDETERMINED PROFIT

★

KNOW YOUR COSTS BEFOREHAND —AVOID UNFORESEEN LOSSES

• When you install Series 700 System of Prefabricated Duct and Fittings you know *beforehand* to the cent what the material will cost. The price of every part you use is plainly marked in the Lamneck Series 700 Catalog.

Figuring your labor costs, too, is a matter of simple arithmetic because Series 700 is so simple and easy to install under any and all conditions that guess work and doubt are eliminated. You can estimate with definite assurance of an unfluctuating profit because you avoid the uncertainty of unforeseen losses that frequently attend the making of your own duct. Absence of forming and setting down of seams, elimination of laborious fitting and doing away with wasteful cutting are features of Series 700 which safeguard profits.

MORE TIME FOR BUILDING YOUR BUSINESS

Series 700 System of Prefabricated Duct and Fittings saves you hours of time required for laborious designing, making and fitting of your own product. This precious time you can devote to more profitable advantage in developing sales and building your business.

Your key to bigger profits is to concentrate your time and energies on merchandising. You'll be free to do so if you place on Series 700 the burden of solving your production and installation problems.

Write for name of your nearest Distributor.

LP INC.

LAMNECK PRODUCTS, INC.

414 DUBLIN AVENUE • COLUMBUS, OHIO

PREFABRICATED DUCT AND FITTINGS FOR ALL TYPES OF RESIDENTIAL WARM AIR HEATING AND AIR CONDITIONING SYSTEMS

Furblo CONVERSION JOBS ARE PROFITABLE

PLENTY OF EFFECTIVE AND CONVINCING PRINTED MATTER TO HELP YOU SELL

Add Furblo
Furblo SAVES FURNACE REPAIRS
Furblo QUICK ESTIMATING BASIS
Through Blazing July Days and Sweltering August Nights Furblo GIVES YOU COMFORT
Furblo
SERIES 5000
Is the ONLY blower for Air Conditioning which protects you by a 5-YEAR GUARANTY
Furblo
VEST POCKET DAT.
Furblo for Comfort-Health-Economy
IN WINTER
IN SUMMER
COSTS VERY LITTLE

Property owners will and do buy FURBLOS to convert present gravity furnaces into modern forced air heating or winter air conditioning systems without asking for competitive bids.

But those same home owners would not even consider buying a new furnace without calling every Tom, Dick and Harry in your community for competitive prices.

Therefore, you avoid competition—make more sales and much more PROFITABLE sales if you talk conversion jobs rather than new furnaces at this season of the year.

Even if your customer is a likely prospect for a new furnace, avoid competition by selling a FURBLO conversion job first. Then, AFTER you have closed the deal for a FURBLO conversion job you have a better chance of switching the deal over to a new furnace without competition.

Like other dealers who regularly follow this plan, you'll not only sell more blowers—but you will also sell more furnaces.

→Mail the Coupon NOW←

Furblo Co., Hermansville, Mich.

Without cost or obligation, send printed matter for my use in selling conversion jobs.

Name .....

Address .....

AA Oct. 39 .....

AMERICAN ARTISAN

WITH WHICH ARE MERGED

FURNACES AND SHEET METALS

AND

Warm-Air Heating

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 108, No. 10 — October, 1939 — Founded 1880

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In This Issue

WE hope that every reader of American Artisan will read the report of the formation of a new national association of sheet metal and allied contractors on page 36. So many men have said this industry needs a national association that now is the time to start if we ever are going to. The officers, committee members, the first annual convention date and place are all reported. Your ideas are invited.

•

During the coming winter it is our plan to provide readers with more and more practical, basic data on automatic firing. Controls for automatc systems (Konzo, page 56); anthracte stokers (page 45); oil burner installation pointers (page 58) are the beginning of this series. Why attention to automatic firing and firing devices? Because, so far as we can judge, old and new home owners think first, these days, of automatic firing when they consider remodeling or new building.

•

So often, we receive questions on proper expansion provisions in large gutters and roofs that we call especial attention to the article on page 63, where an unusual roof has unusually good provisions for movement.

•

Galvanized iron is so easy to solder that most contractors give little thought to welding this material. Yet galvanized iron can be welded successfully if certain simple rules are followed. These rules are shown and discussed on page 66.

•

New uses of old materials might well be the title of the article on page 68. It is the story of many roof repairs until a thinking contractor came along and applied an old material (long terne sheets) which overcame all the defects of application which had wrecked prior roofs.

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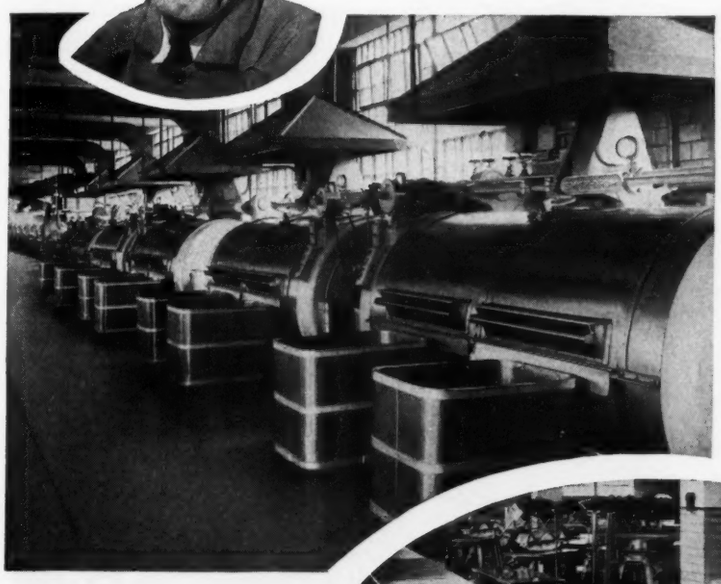
More than 8,000 copies of this issue are being distributed

Look before you Creep!

By TIM SHEARS



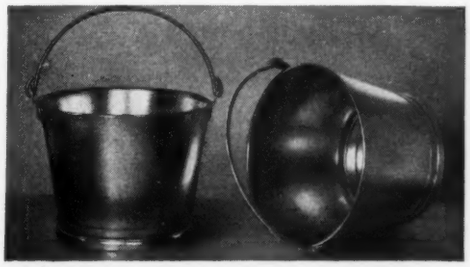
ON ACCOUNT of what happened when I was new in the sheet metal business I've always had a healthy respect for laundries. We're working on a job in one of 'em an' I'm holding a dolly while another guy does the rivetting. First chance I get I sneak off for a smoke.

Just as I'm taking my second puff I hear the foreman coming. So quick, but quiet, I creeps into a little closet. Whoosh! Before I know it I've slid down a chute clean into a washer!

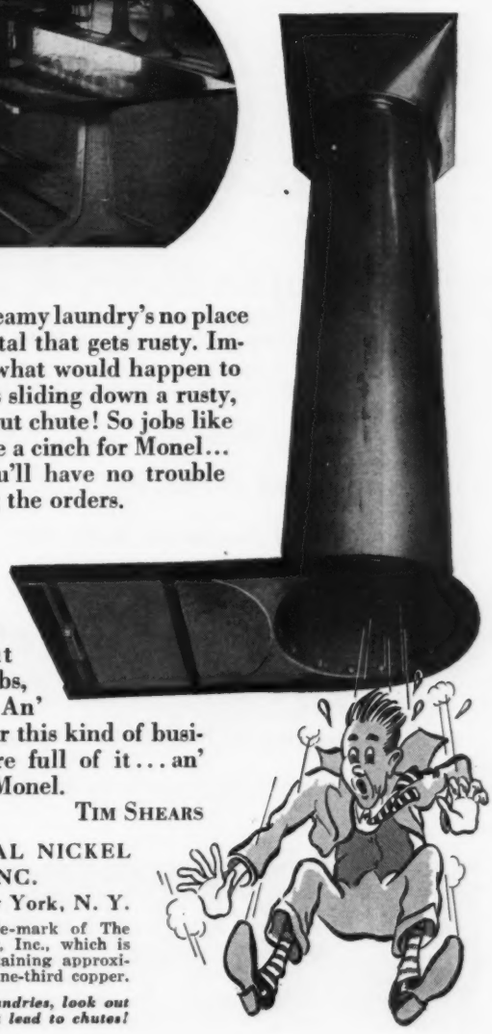
However, there's another reason why I've a healthy respect for laundries: There's plenty of jobs in 'em for a smart sheet metal man, as these pictures show:

1. This first one'll tip you off on how to make the money. Most laundries use washers like these...made of Monel. They find that Monel washers keep clean and smooth inside, so are easy on clothes. Also, they save a pile of dough on power, water, soap an' etcetera. So here's what *you* do:

2. When you call on the laundries remember they need trucks like you see in the first picture, an' also table tops like these. All right, what are you going to make 'em out of? Same as the washers, of course . . . Monel. After all, a laundry owner don't spend thousands of dollars on Monel washers, *then take chances with trucks that get rusty an' tables that splinter!*



4. Turning out Monel buckets is a paying proposition for two reasons: First, because they're simple to make. Second, because the laundries like these Monel buckets. They're easy to keep clean, can't rust, won't leak, and are good for a lifetime of hard service.



3. A steamy laundry's no place for metal that gets rusty. Imagine what would happen to clothes sliding down a rusty, worn-out chute! So jobs like this are a cinch for Monel... an' you'll have no trouble getting the orders.

If there's anything you want to know about making any of these jobs, just drop me a line. An' keep your eyes open for this kind of business. The laundries are full of it . . . an' laundry owners want Monel.

TIM SHEARS

THE INTERNATIONAL NICKEL COMPANY, INC.

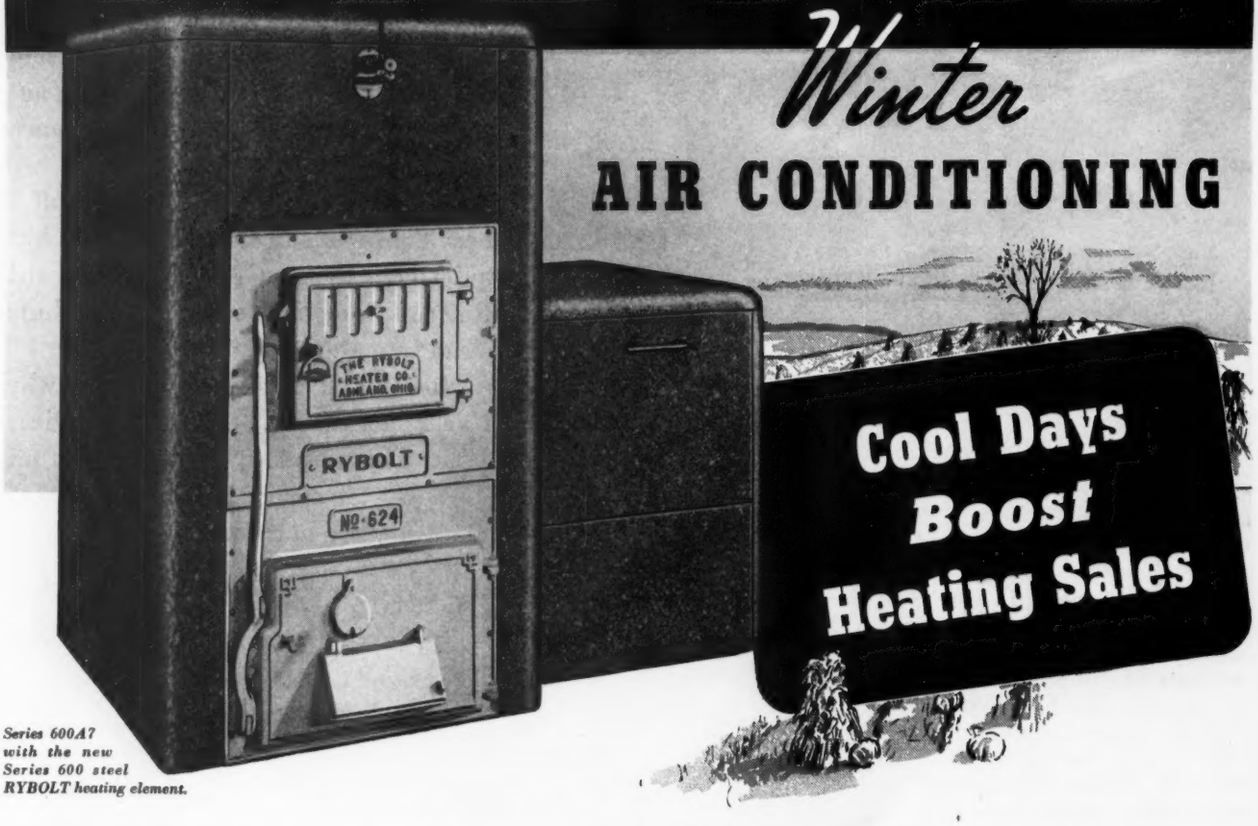
67 Wall Street New York, N. Y.

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

P. S. When you call on the laundries, look out for strange doors . . . they might lead to chutes!

RYBOLT

Winter AIR CONDITIONING



Series 600A7 with the new Series 600 steel RYBOLT heating element.

COOL fall days are going to bring in many late starters who want new heating installations—and want them in a hurry. Regardless of the requirements to be met you can take care of this heavy rush of business with the complete RYBOLT line. RYBOLT Winter Air Conditioners, either coal- or gas-fired, embody all the advanced features of convenience, efficiency and economy that are essential to modern standards of residential heating comfort and satisfaction. RYBOLT Furnaces, steel or cast iron, are designed and built to combine high heating efficiency with low operating cost and lasting dependability.

Back of the complete RYBOLT line, to support your selling efforts, is a record of more than a quarter century of leadership in the residential heating field.

Write today for important RYBOLT information.

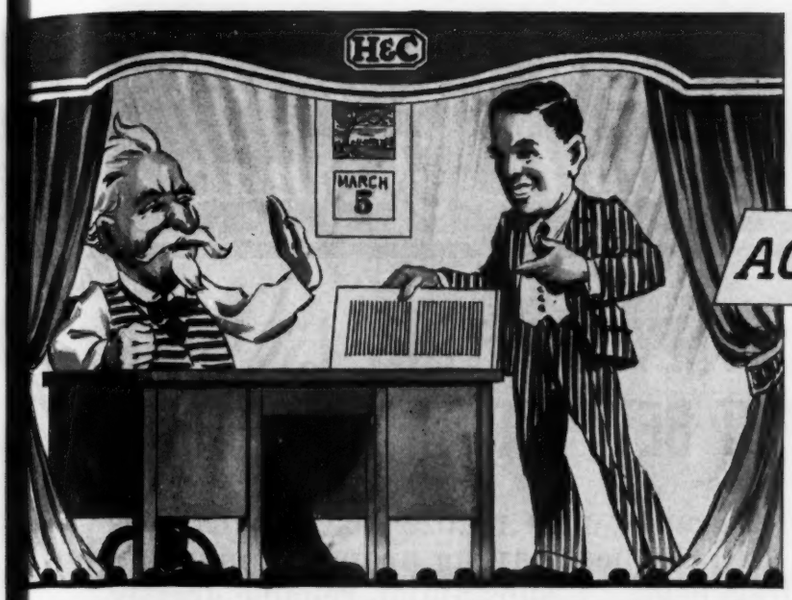
THE RYBOLT HEATER COMPANY

615 MILLER STREET ★ ASHLAND, OHIO

H&C Presents a 3-Act Drama

Entitled

THE COLONEL BUYS A HAT!



ACT 1

Scene: The Colonel's Office.

Time: 2:30 P. M., March 5, 1939.

Jobber's Salesman: "Colonel, here is a register you ought to use—the new H & C No. 86 Design! It has everything you want; adjustable double deflection, mighty attractive appearance, absolutely no resistance."

Colonel: "Obviously, suh, a mighty fine register! But I simply can't afford to use such quality goods."

Jobber's Salesman: "I beg your pardon, Colonel, but you're wrong there. You see, H & C has such a large volume that they can afford to sell better merchandise at a lower price. And consequently, in spite of its many advantages, No. 86 Design doesn't cost you a nickel more than the conventional adjustable register."

Colonel: "E'gad, suh, it doesn't seem possible! An amazing bargain, indeed! But, I still couldn't afford to use it. I have to watch every penny of my costs, and . . ."

Jobber's Salesman: "You're wrong again, Colonel. No. 86 has so many advantages that you will actually be money ahead if you use it on the most competitive job you have. And to show you I mean business, I'll bet you a new hat that if you use No. 86 you'll be money ahead!

Colonel: "By Jove, young man, you're on! I need a new hat."

ACT 2

Scene, the same: 3 months later.

Jobber's Salesman: "Well, Colonel, how are things?"

Colonel: "B'gad, suh, I hate to admit it but things couldn't be better suh! I took your advice and used No. 86 on all my jobs. My customers were so pleased that they practically did all my selling for me. And, not only that, but it actually cost me less to use No. 86 than any register I ever tried regardless of price. The registers worked perfectly and I could adjust them on the job in just a second. I'm bloomin' well through with cheap registers which cost more in the end. Let's go down to the hat store."

ACT 3

Scene: Hattem's Hat Shoppe.

Colonel: "M'man, give this gentleman the best hat in the establishment and charge it to me. He, jolly-well earned it by saving me plenty of money."

★ ★ ★ ***Curtain*** ★ ★ ★

Moral. If you aren't thoroughly familiar with the great time and money saving features of the H & C No. 86 Design and the better installations it makes possible, call your H & C Jobber on the phone NOW!

HART & COOLEY MANUFACTURING CO

FACTORY AND ENGINEERING SALES OFFICE:

HOLLAND (H&C) MICHIGAN

Chicago Office: 61 W. Kinzie St. Philadelphia Office: 1600 Arch St.

Warm Air Registers • Air Conditioning Grilles • Damper Regulator Sets • Dampers • Chain • Pulle

WISE SERIES "A" *Gravity Furnace*

There is a SERIES "A" FURNACE *for either* AIR CONDITIONING *or* GRAVITY *installations*

GRAVITY HEATING IS YOUR "BEST BET" FOR EXTRA PROFITS

Smart heating men realize that gravity jobs are still the best paying proposition in the heating field. A substantial, reliable gravity furnace will enable you to earn handsome profits season after season.

The Wise Series "A" is just the unit to make your installations more efficient, more economical and practically trouble-free. Once installed the Series "A" performs year after year with a minimum of servicing and attention.

Outstanding construction features, such as, the absolutely self-cleaning radiator, air-cell and gas consuming firepot, slipover front, lower front and ashpit cast in one piece and a cast iron base for square or round casings, make this unit one of the strongest and most easily sold on the market.

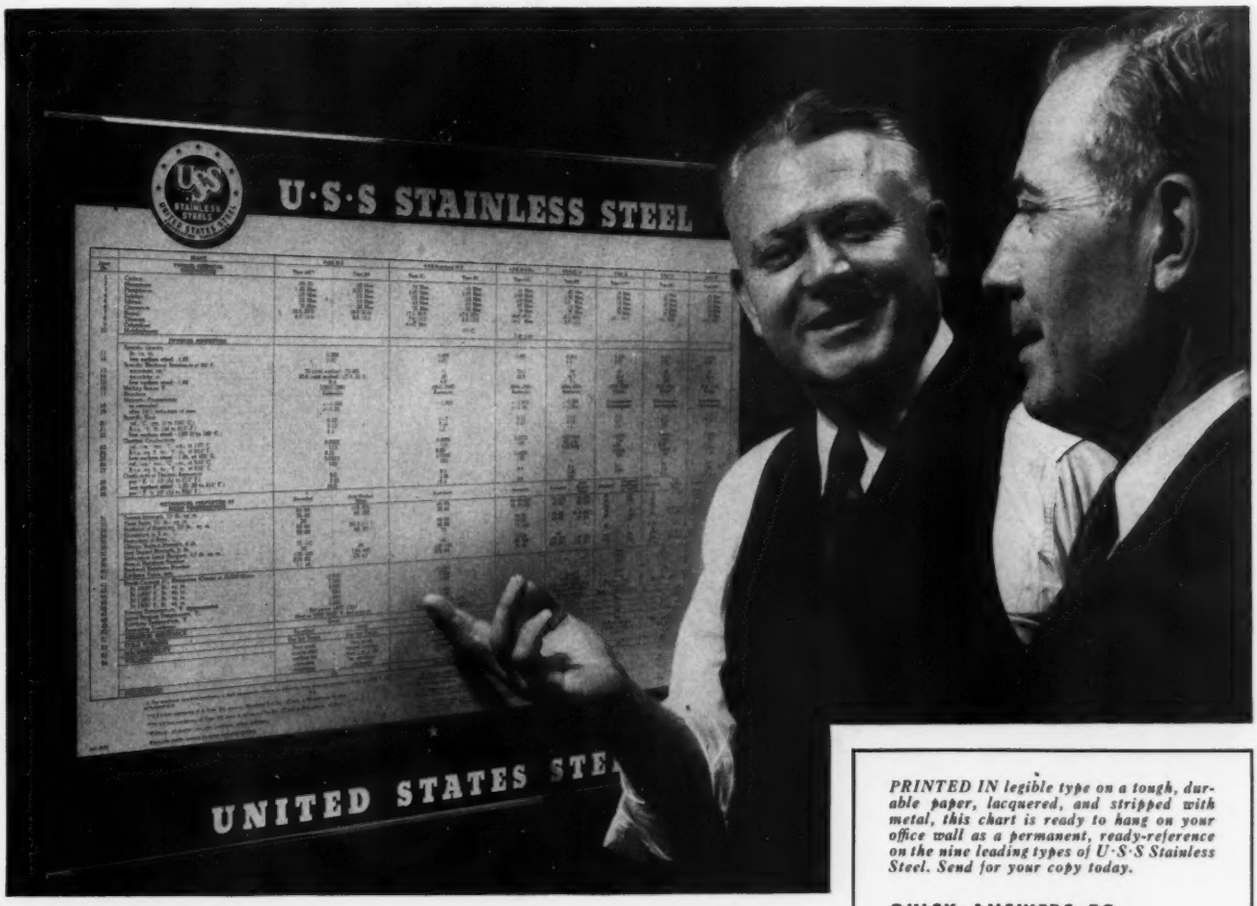
Steady, consistent selling effort on your part backed up by consistently good performance from the Wise Series "A" will make a combination hard to beat. Drop us a line today for further details.

Write **NOW** *for Catalog*

WISE FURNACE COMPANY

AKRON ••• OHIO

"Look what I Got—
JUST FOR CLIPPING A COUPON!"



This handy wall chart gives 364 useful facts on **U·S·S STAINLESS STEEL**

METAL workers, designers, and engineers are finding this fact-packed chart a gold-mine of information. It presents, in clear, easy-to-read form, a digest of all essential data needed for selection, fabrication, heat-treatment, and finishing of U·S·S Stainless Steel.

Here is another example of the kind of cooperation available to you through the United States Steel Corporation Subsidiaries. Besides bringing you stainless steel of carefully regulated quality, we offer the services of a corps of skilled specialists whose sole job is to help you solve any problem connected with stainless steel.

Mail the coupon today for your copy of this useful chart.

PRINTED IN legible type on a tough, durable paper, lacquered, and stripped with metal, this chart is ready to hang on your office wall as a permanent, ready-reference on the nine leading types of U·S·S Stainless Steel. Send for your copy today.

QUICK ANSWERS TO QUESTIONS LIKE THESE

1. *What is the tensile strength of U·S·S 25-12 Annealed?*
   Ans. 90-110,000 lb. per sq. in.
2. *What is the modulus of elasticity of U·S·S 17 Annealed?*
   Ans. 29 million
3. *How to anneal U·S·S 18-8 Mo?*
   Ans. 1950-2050 F. and quench
4. *Which type of U·S·S Stainless is best for cold forming?*
   Ans. U·S·S 18-8 Type 302
5. *Which type of U·S·S Stainless requires no annealing after welding?*
   Ans. U·S·S Stabilized 18-8

Look for this symbol on steel products. It represents the highest quality, the finest metallurgical service.

USS

MAIL COUPON TODAY

UNITED STATES STEEL
CORPORATION SUBSIDIARIES
Room 621 Carnegie Building, Pittsburgh, Pa.
Please send me your wall chart "Properties of U·S·S Stainless Steel."

Name.....
Company.....
Address.....

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
NATIONAL TUBE COMPANY, *Pittsburgh*
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Scully Steel Products Company, Chicago, *Warehouse Distributors*
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

PENN CONTROLS

Basic and exclusive feature contributing to the outstanding performance and long life of Penn's complete line of warm air controls is the Magneseal contact unit (phantom view at right). Electrolytic silver, heavy duty contacts are fully enclosed. Eliminates flexible leads. Operates in any position.

. . . Sell Themselves to Furnace Men Who Try Them

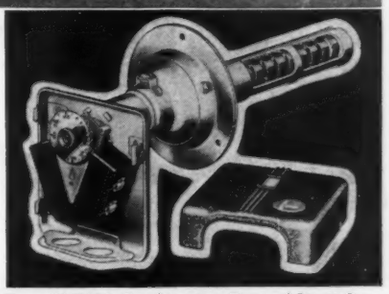
FOR EVERY WINTER AIR CONDITIONING JOB there are Penn controls so dependable in operation, so easily and conveniently installed, that they hold the loyalty of furnace men who once try them.

The famous Penn Magneseal contact eliminates all "pig tails" or flexible leads. Positive snap action on both make and break. Completely enclosed heavy duty contacts are rated for ¾ h. p. A. C. service to 250 V. Replacement is simple should contacts be damaged by abnormal load conditions.

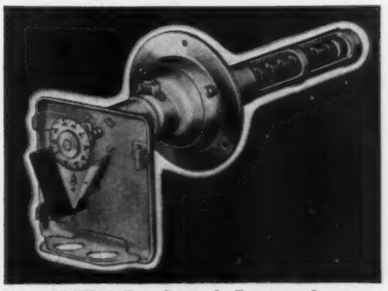
Penn Controls may be mounted in any position, with conduit connection generally downward. Ball and socket mounting flange permits helix to be rotated to most desirable position in the bonnet. Metal guard, standard for years on Penn warm air controls, protects helix against accidental damage in handling and installing.

Penn controls sell themselves. Ask the man who uses them—better still TRY THEM YOURSELF ON YOUR NEXT JOB. Write for detailed information on the complete Penn line.

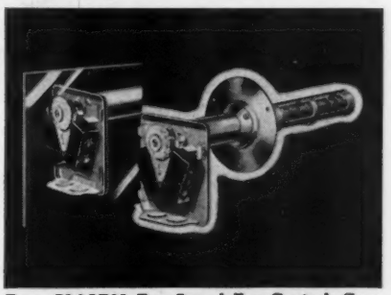
Penn Electric Switch Co., Goshen, Indiana. Branches in Principal Cities. In Canada: Powerlite Devices, Ltd., Penn Electric Switch Division, Toronto, Ontario.



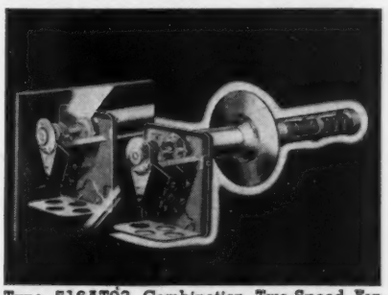
Type 515X01 Combination Fan and Limit Control for forced warm air installation. Both fan and limit settings fully adjustable.



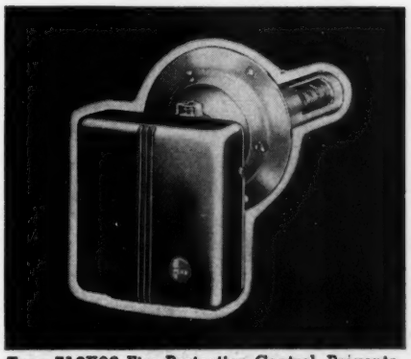
Type 511X01 Fan Control. Cut-in and cut-out points independently adjustable over wide range for all applications.



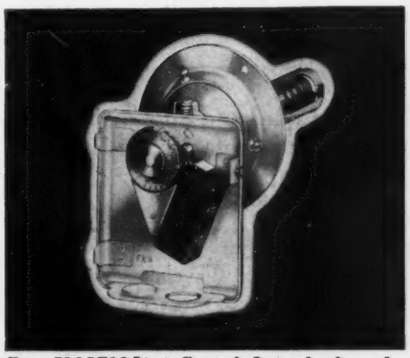
Type 516AT01 Two-Speed Fan Control. Completely adjustable for both low and high speed settings. Enclosed contacts.



Type 516AT03 Combination Two-Speed Fan Control with Limit Switch. Limit setting always above high speed fan setting.



Type 512X03 Fire Protection Control. Prevents fan from spreading fire through duct system on heating, cooling and ventilating systems.

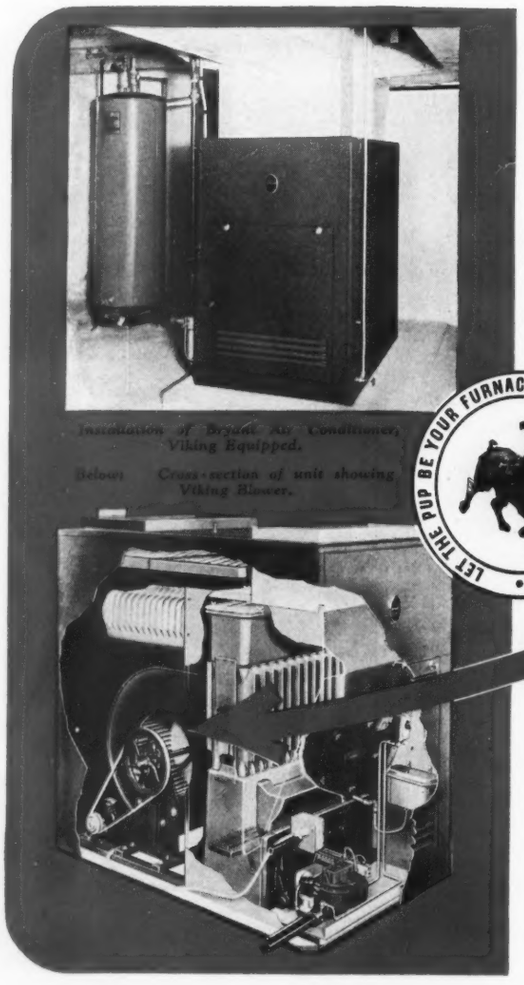


Type 512AT02 Limit Control. A simple, dependable unit for line or low voltage. Enclosed Magneseal contact unit. Fully adjustable.

Type 515AT04 Combination Fan, Limit and Over-run Fan Control. Saves on first cost and installation time on stoker installations.

BRYANT *chooses* VIKING *Blowers*

for greatest efficiency and quiet operation



Installation of Bryant Air Conditioner, Viking Equipped.

Below: Cross-section of unit showing Viking Blower.

● Bryant's testing laboratory is known to be a veritable "torture chamber". The painstaking care and skill of Bryant engineering has been responsible for their consistent reputation among manufacturers of air conditioning equipment. When selecting their blower they insisted on exceptional quietness, efficiency and stamina.

● Viking fans were selected after exhaustive tests proved that they moved MORE AIR, with LESS NOISE and LESS POWER. These advantages are made possible by special VIKING manufacturing and testing equipment, including the exclusive VIKING dynamic balancer, which gives VIKING blowers a standard of perfection unduplicated in the field.

●

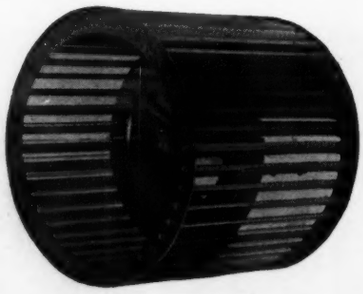
LOOK AT THE BLOWER

in the air conditioner YOU *sell!*

● VIKING Blowers give maximum air-delivery, quietness, and trouble-free performance. That's why you should make sure the unit you sell is VIKING equipped.

● VIKING points the way to greater dealer profits.

DEALERS: Get your copy of the new VIKING folder describing the new 1939 VIKING Blower, the practical unit meeting the modern trend in forced-air heating.

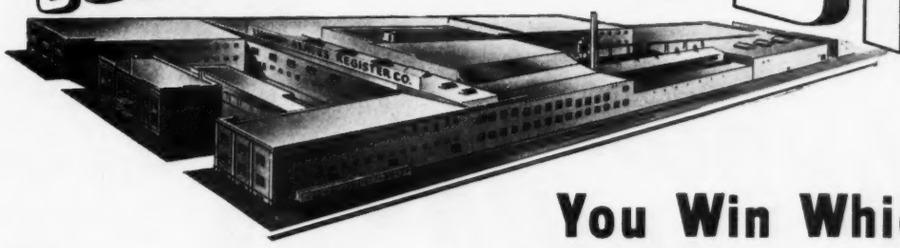


Complete sales and advertising program available for dealers. Write Dept. A

VIKING AIR CONDITIONING CORP.
Main & Center Sts., Cleveland, Ohio

VIKING AIR CONDITIONING CORPORATION

GOING OVER BIG!



You Win Whichever U. S. Way You Select for Controlling Directional-Flow

A-C Louver Type with Inset Panels Setting New Production Records

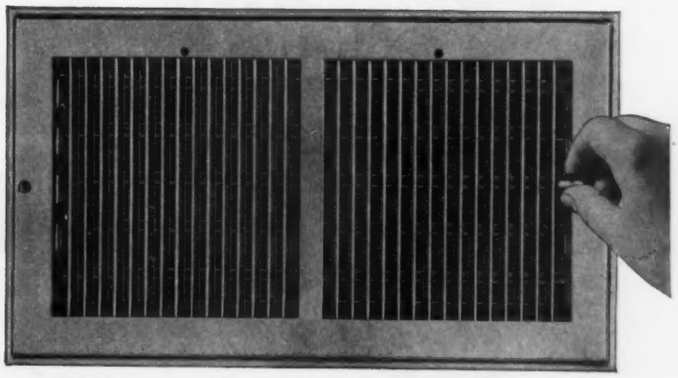
New Inset Panels for Louver-Type and Adjustable-Bar Registers.

Reduces Register Stocks 80%

It was a great day for dealers and jobbers when U.S. Inset Panels for A-C Louver and Adjustable-Bar Registers were introduced. A stock of registers for each directional flow is rapidly becoming a thing of the past. Now, for jobs where price is a big factor, you need only stock basic designs to give you straight flow, and up or down angles. Inset Panels snapped into the back provide all Left, all Right, or Left and Right deflections.

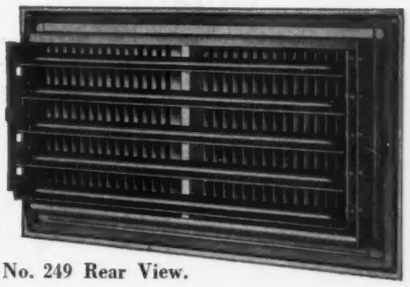
Release your warehouse space and capital investment for better uses by switching to U.S. Louver and U.S. Adjustable-Bar Registers with Inset Panels for A-C installations. You'll be amazed at the time, trouble, and money they'll save you.

NEW U. S. 200 LINE Wins Acclaim for Sensible Construction



MULTI-LOUVER ADJUSTABLE-BAR REGISTER

Gives FULL Grille Coverage
Gives COMPLETE Directional Flow



No. 249 Rear View.

Where the demand is for a Multi-Louver Adjustable-Bar Register, this new 200 line is just the ticket. Design No. 249 shown here is a sturdy, sensibly constructed register. Any desired degree of UP Flow to 45° DOWN Flow is regulated with Side-Lever operated Back-Blades. Any desired degree of side flow to 45° LEFT or 45° RIGHT —or TWO-WAY FLOW to 45° LEFT and RIGHT—is easily obtained by setting the vertical (key-pin operated) ADJUSTABLE-BAR Grille Design. The outstanding feature of this register is the FULL GRILLE COVERAGE of the Air Stream in all Directional Flow Settings.

WRITE YOUR JOBBER OR OUR NEAREST OFFICE FOR COMPLETE INFORMATION AND LATEST PRICES ON U. S. REGISTERS

UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.

Manufacturers of AIR-CONDITIONING and GRAVITY REGISTERS and GRILLES

ACROSS THE COUNTRY

"WINDOW CONDITIONING IS THE BEST INVESTMENT WE EVER MADE"

"STORM SASH KEEP DRAFTS OFF THE BABY— OUR GAS BILLS WERE CUT ALMOST IN HALF"

•

"NOW WE CAN ENJOY AUTOMATIC HEAT AND HUMIDIFICATION"

•

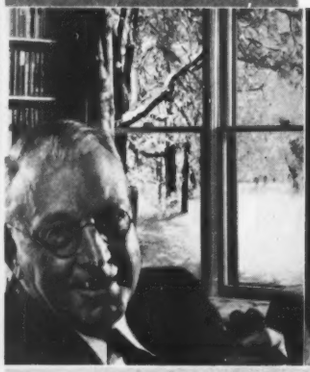
"OUR WINDOWS NO LONGER STEAM UP— TEMPERATURES STAY EVEN"

"With Storm Sash I find my houses rent easier, to better tenants."
—Martha Knudson

"Our baby played on the floor all last winter without catching cold."
—R W Edebase

"Our fuel bills are lower than any of the neighbors."
—A E Perry

"We get even heat and our home is always free of window drafts."
—Mrs M A Wolin



"NOW WE CAN ENJOY AUTOMATIC HEAT AND HUMIDIFICATION . . . no more drapes and woodwork ruined by excessive condensation. . . Our storm sash has made our modern heating plant practical."

"STORM SASH ELIMINATED DRAFTS IN OUR HOUSE . . . the children are healthier . . . have fewer colds, and it's a lot easier to maintain even temperatures upstairs and down . . . we'll never be without storm sash again."

"NO BARRICADES AROUND THE WINDOWS . . . I no longer have to keep after the children to keep away from drafty, frosted windows . . . they play where they please and look out of clear, dry windows."

"IT PAID FOR ITSELF IN LESS THAN TWO WINTERS . . . and from then on, it's all profit. I figure th now I'm saving one ton of coal out of eve four, and that means plenty when you ha to do all the shoveling yourself."

RY HOME OWNERS SAY -

"They save fuel, eliminate condensation and are good sound deadeners."
—Ted Simons

"Storm sash cut our heat bill almost in two."
—Warren D. Caswell

"Storm and street noises are almost eliminated."
—Mrs K T Guyer

"It used to take a temperature of 80 degrees to keep the house comfortable but now it's fine at 72."
—John Alden

"Savings in fuel the first year paid for the Storm Sash."
—Fred Pletcher

"They earn more than $22 every year through fuel savings alone"
—Roy E Urber

"The savings paid for the Storm Sash and now the fuel saving is all clear profit."
—James Sinclair

"I'm a builder and I always recommend Storm Sash because of savings and comfort."
—Lewis Peters

"Our oil bill used to be $92 a year and last year it was $62."
—Mrs A Deister

"My baby can play on the floor without catching cold."
—E M Becher

"Easy to wash windows from damaging wallpaper and paint underneath windows."
—Albert J. Snyder

"With Storm Sash we sit by the windows in comfort."
—Earl W. Allen

"As a contractor, I say no house is complete without Storm Sash."
—Edward H Dalby

"Saved our window sash from rotting—we wouldn't be without them."
—Lewis Liebert

SAGINAW, MICH.
MILWAUKEE, WIS.
ERIE, PA.
ROSSFORD, O.
PITTSBURGH, PA.
DES MOINES, IA.
FT. WAYNE, IND.
DAYTON, O.
COLUMBUS, O.
INDIANAPOLIS, IND.
LOUISVILLE, KY.
KANSAS CITY, MO
NORMANDY, MO.
AUBURN, ME.
MANCHESTER, N. H.
QUINCY, MASS.
SPRINGFIELD, MASS.
MARLTON, N. J.

L·O·F WINDOW CONDITIONING WIDENS YOUR MARKET FOR AUTOMATIC HEAT AND AIR-CONDITIONING EQUIPMENT

Across the country word of the outstanding benefits of Window Conditioning is being spread by thousands of users—satisfied users who have enjoyed greater winter comfort . . . cut fuel bills . . . eliminated drafts and excessive condensation on windows . . . with Storm Sash.

Millions will read the forceful, compelling L·O·F Window Conditioning advertisements appearing again this fall in leading national magazines. These advertisements point out that the operating cost of automatic heating equipment is *reduced*—the effectiveness of winter air-conditioning equipment is *increased*—by Window Conditioning.

To bring your equipment within the reach of more and more people, talk Window Conditioning—recommend it in your contacts with building contractors, home owners and prospective home builders.
Libbey·Owens·Ford Glass Company, Toledo, Ohio.

HERE IS WHAT WINDOW CONDITIONING DOES

1. It reduces fuel bills—in many cases as much as 30%.
2. It helps get rid of the nuisance of foggy windows—excessive condensation that damages draperies, rugs and woodwork finishes.
3. It permits the use of smaller and less costly heating equipment.

LIBBEY·OWENS·FORD
QUALITY GLASS

LOOK FOR THE LABEL

No Matter What They Need,

You Have It in the COMPLETE MONCRIEF LINE

"Aristocrat" Coal-Fired Winter Air Conditioner Either Cast or Steel heating units. Automatic operation gives the homeowner long-time carefree service.

Series "C"
Cast furnace; old-time favorite that continues to give the homeowner the greatest satisfaction in warm air heating.

IT takes all kinds of customers with all kinds of needs to build a business, and with the complete Moncrief line you can fill ALL the warm air heating and air conditioning needs of your community. Whether your customer talks quality or price, whether he burns coal, gas, or oil, you have just the unit he needs in a Moncrief.

Other advantages you have are—the Moncrief Financing Plan. It offers the most liberal terms, easy to operate. No down payment with three years to pay if desired. Moncrief Engineering service to help you estimate and lay out plans and Moncrief Literature to help you sell.

Write for particulars.

The Henry Furnace & Foundry Co.
3473 E. 49th St., Cleveland, Ohio

MONCRIEF FURNACES
Cast or Steel
WINTER AIR CONDITIONERS—Gas, Coal or Oil
"MONCRIEF SUPPLIES EVERYTHING USED ON AN AIR CONDITIONING JOB"

Here's a "Sheet Metal Bonus"

FOR YOU AND YOUR CUSTOMERS

Most sheet metal jobs represent a long-term investment. That's why buyers seek every assurance of full value. They rightly expect your work to give good service and cost little to maintain.

This is a big order; yet it is one you can easily meet when you combine your ability with galvanized ARMCO Ingot Iron. This highly-refined iron holds a 33-year reputation for durability, low-cost maintenance and ease of working.

Once up it saves owners costly repairs and replacements. In the shop its ductility, uniform flatness and full, tight galvanizing helps you produce the sort of work that goes up fast and advertises your skill. Recommend and use galvanized ARMCO Ingot Iron wherever a reasonably-priced, durable job is wanted. This will please customers and bring you repeat business.

When your work needs the added protection and beauty of paint, specify galvanized ARMCO PAINTGRIP sheets. The bonderized PAINTGRIP finish takes paint immediately and holds it long. No need for acid-washes or weathering. Call your nearby ARMCO Distributor for quick deliveries on these and other ARMCO grades — or write us direct. The American Rolling Mill Company, 1781 Curtis Street, Middletown, O.

ARMCO ARMCO **INGOT IRON**

You must be a step ahead *To Win*

Just keeping pace with the other fellow enables a runner to stay in the race but it's the wisely-trained man who has learned how to save effort who steps out ahead to win.

Profitable sheet metal shops are made so by men who, like the runner, use their ability where it counts the most. Knowing the best source of supply for materials is one way they save time and money. Keeping shop costs down by using modern tools and machinery is another. Where do they go for these products? In a great many cases you will find the answer is OSBORN.

OSBORN'S reputation for quality and fair-dealing has grown with the trade for more than three-quarters of a century. Our complete stocks assure prompt deliveries and large volume makes available to us the products of the country's leading manufacturers — those offering greatest value. Are you making full use of OSBORN'S unusual service facilities?

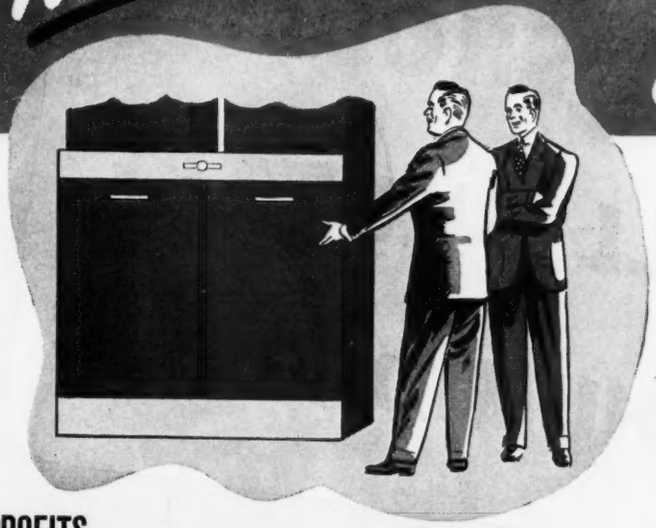
Do you sometimes find it difficult to figure a job for lack of sufficient information or a price on a certain item?

The OSBORN Book No. 39 describes practically all of the materials, tools and supplies used by the trade and includes their prices. Would you like a copy?

THE J. M. & L. A.
OSBORN Co
Manufacturers—Distributors
BUFFALO · CLEVELAND · DETROIT
Metals and Metal Products

A DEPENDABLE SOURCE OF SUPPLY FOR 80 YEARS

Now AS NEVER BEFORE *G-E* IS READY TO TALK DEALER PROFITS!



PROFITS from Warm Air Heat. The *new* low prices on the *new* line of G-E Winter Air Conditioners mean immediate opportunities for you to cash in on this broad market—and to increase your duct work. More than just a warm air furnace and a fan—these are the finest Winter Air Conditioners G-E has ever made!

RIGHT NOW—a G-E Dealer Franchise means business. A profitable business that can build success and security for you for years to come.

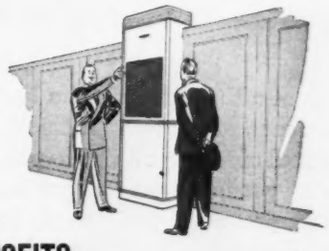
Today, successful merchandising demands *complete* lines for 12-months-in-the-year selling. Steady turnover and uninterrupted profits. G-E offers you this opportunity with its *complete* lines—to broaden your markets, to achieve your success.

Backing up G-E Franchise Dealers is every known support to help you sell. G-E Sales and Engineering counsel, advertising, display, dealer promotion.

Dealers with vision will recognize the profit potentials of a G-E Dealer Franchise.

PROFITS from Split Systems. For the finest combination of heat plus winter air conditioning—sell a G-E Oil or Gas Furnace with Conditioner Unit. You have the opportunity of adding a summer cooling system to operate with it later.

PROFITS from Home Summer Cooling. With G-E, you can sell small units for cooling one room or a system for cooling the whole house. After your heating sales season, here is the logical step for continued turnover and profits!



PROFITS from Commercial Air Conditioning. Individual store and office cooling units up to central plant cooling systems for stores, shops, hotels, theatres, etc. And the universally accepted G-E Condensing Units—from fractional h.p. up to 100 h.p.

PROFITS from Air Circulators. A "natural" for lower income homes. For homes, offices, stores, shops and factories. All types use the unique G-E Aphonic Fan for unusual quietness.

PROFITS the Year 'Round! *Complete* lines that permit selling *every* prospect *every* month in the year. With G-E you iron out the pits and the peaks—for year 'round turnover and profit!

PROFITS from Advertising. Leads from national magazine and cooperative newspaper advertising of *your* products, in *your* territory, reaching *your* prospects, to build *your* success.

PROFITS from Promotion Support. If it helps you to do more business, G-E has it! Direct mail, store identification, displays, consumer literature, specification sheets, mats, electros.

FILL IN AND MAIL COUPON

GENERAL ELECTRIC

Automatic Heating, Cooling and Air Conditioning

GENERAL ELECTRIC COMPANY
Div. 190-653, Bloomfield, New Jersey

Give me details about the new G-E Dealer Franchise for my territory.

NAME.....

STREET.....

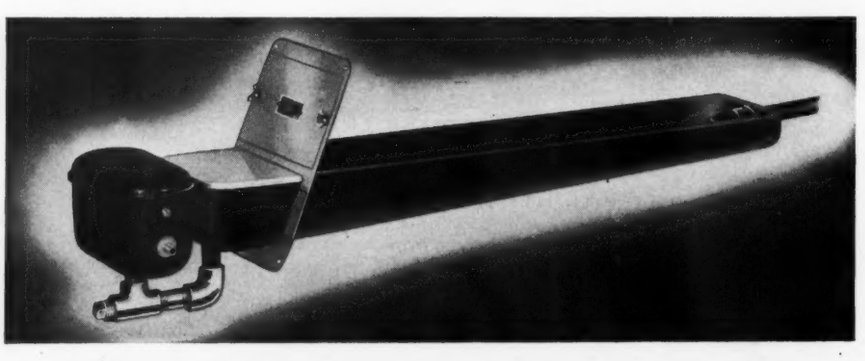
CITY.....STATE.....

THAT is a common question asked by furnace dealers, when discussing the possibilities of their taking on the SKUTTLE line of Automatic Humidifiers. It's a logical question for them to ask, because most of them have had the unprofitable experience of handling humidifiers that were difficult to install and expensive to service. Naturally they are skeptical of taking on another line of humidifiers and we don't blame them—so if you're one of those "skeptics" we can prove to you that you can make a profit by selling humidifiers if you handle the SKUTTLE line. How can we prove it to you? Simply by asking you to look at our record of 22 years in the manufacture and development of completely automatic humidifiers, by the number of large furnace manufacturers who specify SKUTTLE humidifiers as standard equipment year after year, and by the ever-increasing number of furnace dealers who are handling the SKUTTLE line. But if you are a "skeptic", you won't be convinced by our saying how much better the SKUTTLE automatic humidifiers are than the other makes, or how its patented water supply valve is trouble-free in operation and eliminates costly service calls—no, you'll only be convinced of their superior performance when you have installed one and see how it works. Send your order today and let SKUTTLE humidifiers convince you that profits can be made in selling automatic humidifiers.

NO LONGER A PROBLEM TO INSTALL CERAMICS

Skuttle's new type cadmium collar is adjustable so that a ceramics unit can be installed by merely removing 2 thumb screws on the collar and taking off the cover plate to insert the ceramic unit.

This is another SKUTTLE selling feature, for ceramics get clogged in time, and should be replaced as quickly and easily as filters.



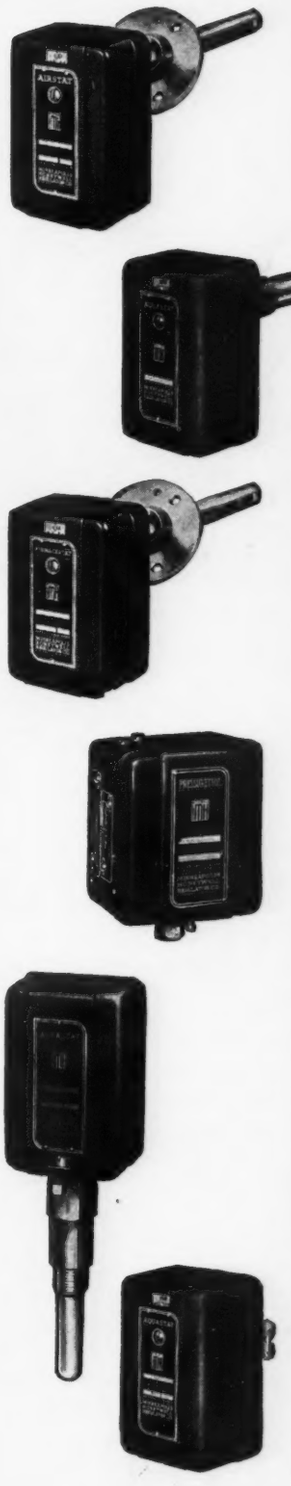
WRITE TODAY FOR **Skuttle** INFORMATION

J. L. SKUTTLE COMPANY — AUTOMATIC HUMIDIFIERS — 999 FRANKLIN ST., DETROIT, MICH.

Smaller instruments and IMPROVED PERFORMANCE

with the new Minneapolis-Honeywell

MATCHED UNIT *Limit Controls*



THE new Minneapolis-Honeywell line of Matched Unit Limit Controls are as modern in performance as they are in appearance. They are smaller in size, simpler in construction, but their performance has been greatly improved. They are styled by Henry Dreyfus to harmonize with the most modern heating equipment. Your customers will appreciate their simplicity, their sturdiness, and their improved appearance. Your Service Department will readily recognize the improved performance. Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue South . . . Minneapolis, Minnesota.

10 IMPORTANT IMPROVEMENTS

1 • Distinctive Appearance
2 • Matched Units
3 • Small and Compact
4 • Simple Adjustment
5 • Visible Scales
6 • Enclosed Bellows
7 • Protected Helix
8 • New Mountings
9 • Greater Precision
10 • Longer Life

Since 1885
Partners in **Public Acceptance** for **AUTOMATIC HEATING** and **MINNEAPOLIS-HONEYWELL** *Control Systems*

Dependable Controls Cost Less Than Service

"We help you make money on every job .. WE'RE GENUINE SHEET METAL SCREWS!"

FROM out of all the talk on sheet metal screws rises one clear, indisputable fact: *you can't beat the genuine article for best results!* You can't beat the genuine Parker-Kalon Screws—and tens of thousands of users will tell you why . . .

Because of uniform accuracy as to size, and full threading to the head, these genuine Parker-Kalon Sheet Metal Screws drive in easily and hold securely. Because heads stay on and threads don't strip, they end the expense and annoyance of having to replace broken screws. Because they save time and effort, and make stronger, *better* fastenings, these genuine Parker-Kalon Screws help *you*, the sheet metal contractor, make money on every job.

Glance over the four big results of Parker-Kalon's 25 years of screw manufacturing leadership. Learn *why* more than 40,000 shops insist on *Parker-Kalon* —the *genuine* Sheet Metal Screw.

PARKER-KALON CORP., 200 Varick Street, New York, N. Y.

4 REASONS WHY YOU CAN DEPEND ON PARKER-KALON PRODUCTS

1. **UNEXCELLED LABORATORY FACILITIES** . . . the Parker-Kalon Laboratory which controls and maintains the high standard of quality for which Parker-Kalon Screws are so widely recognized, represents an investment of over $250,000.
2. **SPECIALIZED PRODUCTION EQUIPMENT** . . . is required to produce Parker-Kalon Self-tapping Screws and to maintain their uniformly high quality. The Parker-Kalon plant is famed as the most up-to-the-minute in the industry.
3. **FREE ENGINEERING SERVICE** . . . to help designers and production men obtain better fastenings at lower cost. Available throughout the country, Parker-Kalon Assembly Engineers render free service to both users and prospective users of Parker-Kalon Self-tapping Screws.
4. **AVAILABLE EVERYWHERE** . . . no matter wher your plant is located there is a reputable supply house distributing Parker-Kalon Screws . . . assuring you a dependable source of supply.

PARKER-KALON *Sheet Metal Screws*

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

Checkmate water

. . . with ★ YOUNGSTOWN GALVANIZED SHEETS

The old hot air furnace poured the atmosphere of the Sahara Desert into a house. But the modern winter air conditioning job is sweeping ahead because it brings healthful, life-giving moisture to home atmosphere. But along with the moisture comes corrosion trouble for the ducts and for you, too, unless you have installed well galvanized sheets.

That's why Youngstown has been exercising the greatest possible care in making Youngstown Galvanized Sheets. Where a pin hole in the zinc covering would spell trouble, Youngstown makes sure of complete zinc covering by thoroughly cleaning sheets before galvanizing and by passing sheets slowly and steadily through the galvanizing bath, inspecting every operation and ruthlessly discarding any sheet not up to the Youngstown standard.

When you put in a duct job, the workability of Youngstown Sheets will help you get a job in as planned -- and after the job is in, your reputation will be protected from kick-backs on quality of material. Youngstown Sheets help you make more money on each job -- and assure satisfied users which helps you get more jobs.

★

Sheets - Plates - Pipe and Tubular Products - Conduit - Tin Plate - Bars - Rods - Wire - Nails - Tie Plates and Spikes. 10-93

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices - YOUNGSTOWN, OHIO

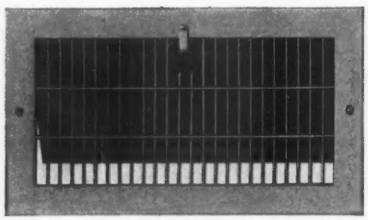
INDEPENDENT "FABRIKATED"

REG. U. S. PAT. OFF.

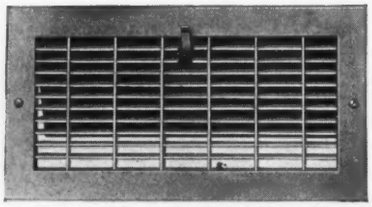
Air Conditioning Registers and Grilles

"Fabrikated" construction presents fine appearance, is strong and most rigid. "Fabrikated" registers and grilles give more than usual free area, affording greater capacities. The steel outer frame is welded to form a solid piece. The grille bars are steel strips set on edge and held firmly by openings cut in outer frame. All registers shown can be furnished as grilles, without valves. Any size, any finish.

THE INDEPENDENT REGISTER COMPANY
3747 EAST 93rd STREET • CLEVELAND, OHIO

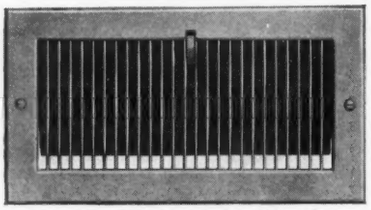


No. 321—Openings in face 3/8" wide. Grille bars 1/2" deep.

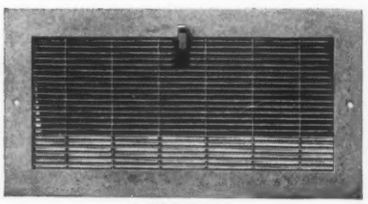


No. 311—Openings in face 3/8" wide. Grille bars 1/2" deep.

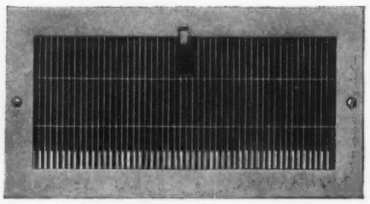
These numbers are of "Fabrikated" construction, but the grille bars are set permanently at the factory for straight outward flow; but on order can be set to deflect air to any angle or combination of angles. Can not be adjusted after registers are installed.



No. 211—Openings in face 3/8" wide. Grille bars 5/8" deep.



No. 312



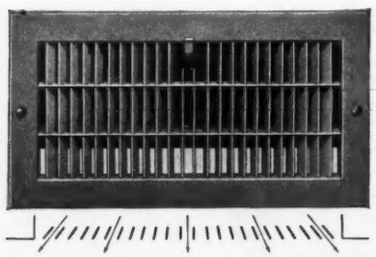
No. 322

"FABRIKATED" FINE-MESH REGISTERS

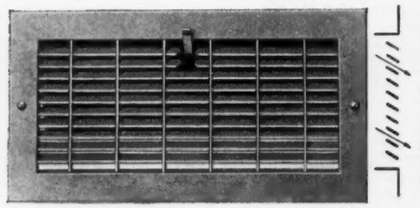
Small openings present low visibility—are "pencil-proof." Grille bars are permanently set for straight outward flow of air, but on order can be set at any angle or combination of angles.

INDEPENDENT "FABRIKATED" ADJUSTABLE DIRECTED AIR FLOW REGISTERS

Grille bars may be adjusted either before *or after installing* to deflect air flows accurately to any desired angle, up or down or sidewise, or to any combination of angles, similar to that below.

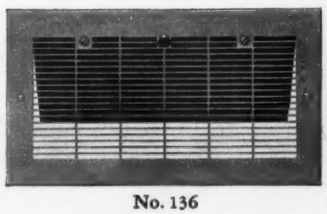


No. 321-A—Diagram shows grille bars adjusted for fanwise air flow.

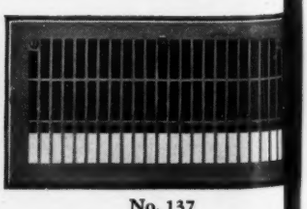


No. 311-A—Here grille bars are set to deflect air downward. They may be set at any other angle or angles.

Each grille bar can be set individually with hand tool accompanying each shipment.



No. 136



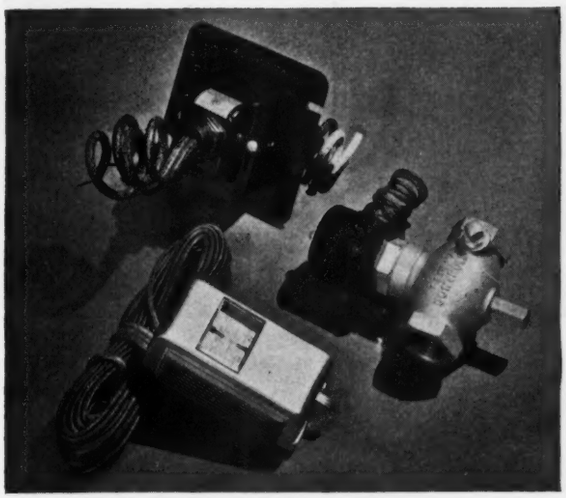
No. 137

INDEPENDENT WROUGHT STEEL REGISTER

This line does not compete with "Fabrikated." It affords the tr a line of air conditioning registers of fine appearance which be used to advantage on low-priced installations. Made in b wall and baseboard types.

WRITE FOR CATALOG AND DATA BOO

GENERAL CONTROLS
GAS HEATING PACKAGE SETS



TYPE T-30

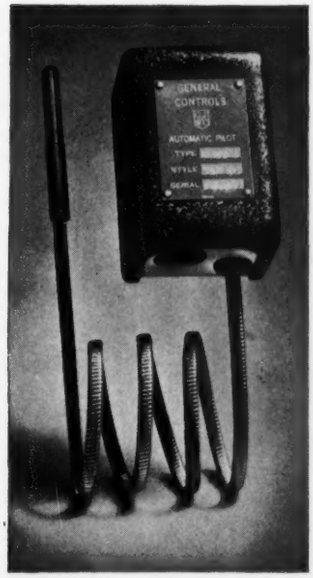
EASY TO BUY

EASY TO SELL

EASY TO LOOK AT

EASY TO INSTALL

This is the popular General Controls T-30 Gas Heating Package Set. It includes Silent Type K-3B two wire gas valve, T-70-1 two wire attractive Metrotherm, transformer and 30 feet of wire. It is recommended for gas-fired boilers, floor furnaces, conversion burners, warm air, blower and gravity furnaces. Specify and install General Controls Gas Heating Package Sets. ***...they're just right***



THERMOPILOT AND THERMOVALVE

THERMOPILOT A-100. Applying flame to thermocouple tip makes electric contact, allowing main gas valve to open. Pilot light failure opens circuit. Automatically resets when the pilot is relighted. Now, with flexible lead connections.

TYPE	COUPLE LGTH.	CONTACTING LIST
A-100-1	18" or 30"	2 Wire—Contacts open pilot cut $6.80
A-100-2	18" or 30"	3 Wire—Common-on-off 7.40

Other couple lengths available on order at slight extra charge.

THERMOVALVE MR-2. Utilizes same pilot flame failure principle as thermopilot, but permits a manually reset valve to shut off gas flow resulting in 100% shut-off. Operates horizontally or in any desired position. Now, with two wire flexible lead connections.

Type	I.P.S.	Cap. @ 0.5"	Couple Lgth.	List
MR-2	⅜"	90 cu. ft.	18" or 30"	$5.00
MR-2	½"	165 cu. ft.	18" or 30"	6.40
MR-2	¾"	320 cu. ft.	18" or 30"	8.00
MR-2	1"	400 cu. ft.	18" or 30"	9.60
MR-2	1¼"	900 cu. ft.	18" or 30"	15.00
MR-2	1½"	1200 cu. ft.	18" or 30"	17.60

SEND FOR CATALOG TODAY

GENERAL CONTROLS

450 East Ohio St., Chicago, Ill.
267 Fifth Ave., New York City
1505 Broadway, Cleveland, O.
3626 Wyoming St., Kansas City
6432 Cass Ave., Detroit, Michigan
25 No. Live Oak St., Houston, Texas
915 Bryant St., San Francisco, Calif.
700 West Ivy, Glendale, California

Distributors in all principal cities

General Controls

Yes sir, business is good at General Controls. And that means good at General Controls in New York, Cleveland, Chicago and Detroit—and in Kansas City, Houston, San Francisco and Los Angeles. Are we, you ask, getting ready for fall? Well, yes and no. All spring and summer long we've been supplying an extraordinary unseasonal demand from your industry for our popular and logical heating controls.

are going

And being busy means that our larger staff of employees working in increased factory space, are running in high gear, well prepared for your fall and winter heating season. Our own little survey shows our products going to all four corners of our country —going to town, city, country homes and buildings and industries through our ever-widening branch and distributors' service offices.

to town

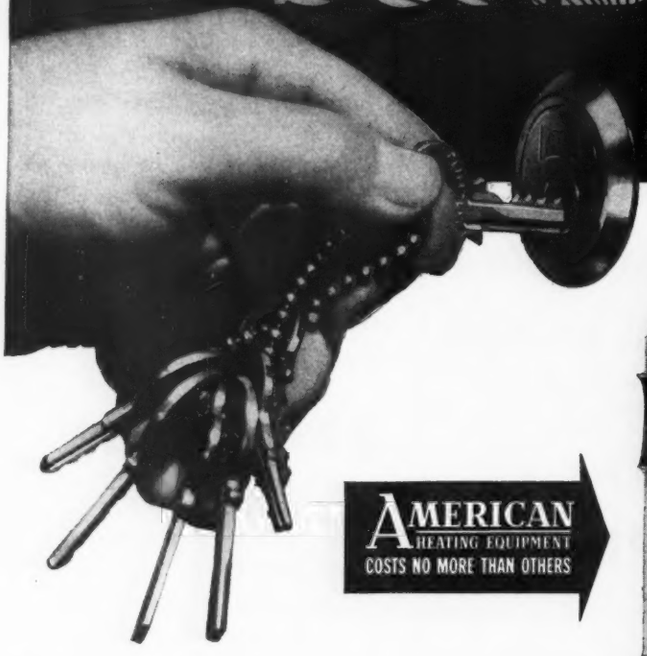
Is there a reason? Those who have come to see us have stayed to buy and left to install our products. They feel we've keyed our products and our organization to the markets and to the times. Yes, General Controls is and are going to town, everywhere. Your request for a 1939-40 Catalog of our popular and logical line of heating controls, and the reading of it, will tell you why. Write for it today.

everywhere

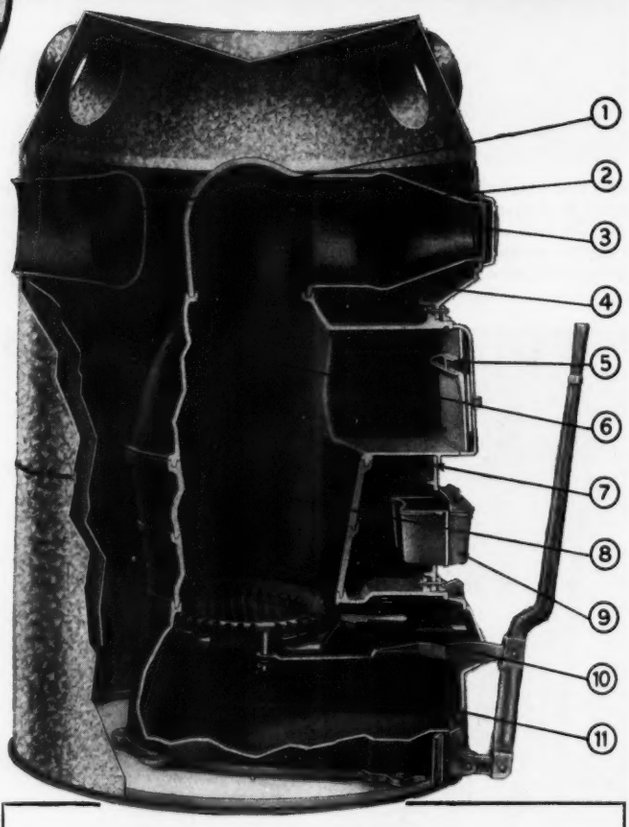
They're just right

OPEN THE DOOR TO MORE SALES WITH SUNBEAM

SERIES NO. 1000 CAST IRON FURNACES



AMERICAN HEATING EQUIPMENT COSTS NO MORE THAN OTHERS



AVERAGE in price, but tops in quality and efficiency, the Series No. 1000 Sunbeam Cast Iron Furnace is a best seller in any community. It has the features, the price and the name *you* need to make sales and profits!

Seven sizes, with fire pots ranging from 18″ to 30″ in diameter, enable you to meet virtually every cast iron furnace demand. It is also available as a pipeless Furnace in five sizes.

The Sunbeam Series No. 1000 and two series of Steel Furnaces are quickly available from hundreds of jobbers and warehouses from coast to coast. Write today for the name of the Sunbeam Jobber nearest you, and for details of the complete Sunbeam line.

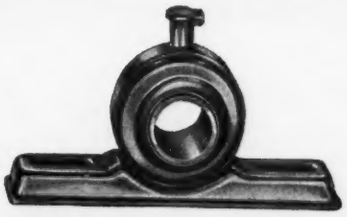
SPECIAL FEATURES

1. SMOKE COLLAR—cast with radiator, extends outside of casing. Radiator can be revolved for easy connection to flue.
2. RADIATOR—cast in one piece. Oversize capacity for the hot gases; yet allows ample air circulating space.
3. CLEAN-OUT COLLAR—cast with radiator. The cover bolts over large opening, thus effecting gas-tight connection.
4. UPPER FRONT PANEL—slips in place over and around feed section, eliminating possibility of gas leakage.
5. HOT BLAST—admits heated air—necessary for complete combustion of gases.
6. COMBUSTION CHAMBER AND FEED SECTION. Opening at top is centered above fire pot. Feed door and opening are machine ground.
7. LOWER FRONT PANEL—slips in place over and around ash pit section. Impossible for ash-dust to enter warm-air chamber.
8. TWO-PIECE FIRE POT—made of heavy-weight Sunbeametal, with extra deep cup joints. Two-piece construction assures long life.
9. VAPOR PAN—extra large capacity.
10. DUPLEX GRATE—has more free area than ordinary grates. Can't stick. Prevents ash accumulation against fire pot walls.
11. ASH PIT—high and spacious. Door and door openings are machine ground.

AMERICAN RADIATOR & Standard Sanitary CORPORATION
ELYRIA, OHIO

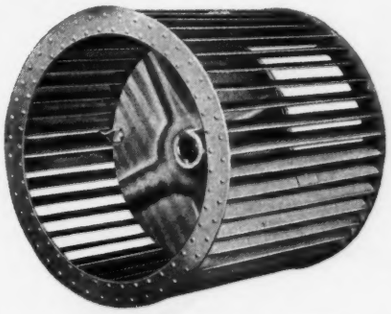
SUNBEAM WARM-AIR FURNACES

Copyright October 1939, American Radiator & Standard Sanitary Corporation



LAU Pillow Blocks

Positive self-alignment at all times. Light weight, durable. Bearing housing die-formed from heavy gauge steel. Durex bronze bearing is lubricated through pores of bearing by capillary action . . . complete lubrication at all times.

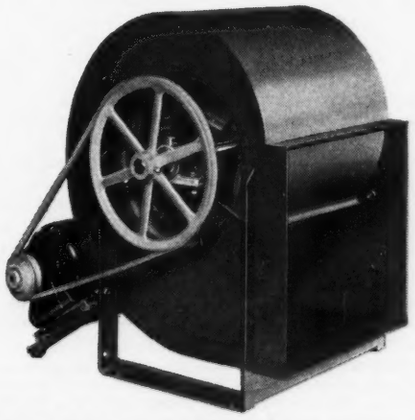


LAU Blower Wheel

Squirrel cage, forward curve, multi-blade type wheels. Double inlet, double width. All die-formed parts. Dynamically balanced. Guaranteed true and without vibrations at operating speeds.

LAU Pulley Wheels

Made from close-grained cast iron . . . accurately machined and balanced . . . true-running . . . silent. Also, variable speed pulleys with speed variations up to 30%.



LAU Furnace Blowers

Low-speed, high delivery blower assembly. Variable speed drive. Automatic belt-tightening device. Automatic cut-out on motor. Rubber cushioned . . . eliminates noise and vibration. Available with top, side, and rear motor mounting. 20 sizes.

Step Ahead to BIG PROFITS

AND REAL CUSTOMER SATISFACTION WITH

LAU FURNACE BLOWER EQUIPMENT!

Join the Hundreds of Manufacturers Who Say, "Standardize on

LAU EQUIPMENT!"

Coupon Brings Complete Information

Manufacturers of furnace blowers everywhere are using Lau precision built blower wheels, housings, variable and constant speed pulleys, self-aligning pillow blocks, casing mouldings and complete furnace blower assemblies in casings of their own fabrication. They use Lau parts for real profits and enduring customer satisfaction.

Lau furnace blower parts are built for the exacting manufacturer and sheet metal man who knows that when equipment is right—and every Lau part MUST BE RIGHT—customers become real boosters.

Precision built by experienced craftsmen to the designs of competent engineers . . . tested for silence, absence of vibration, and long wear—LAU parts give you real customer satisfaction.

Lau furnace blower equipment is easy to assemble . . . quick to install . . . and priced for profits to you on fabrication and installation!

No wonder such a high percentage of the nation's air conditioning manufacturers specify Lau parts! And wideawake sheet metal men and contractors are demanding so many Lau products that our factory capacity is now being doubled!

Find out how you can cash in on Lau's superiority, and make real profits with Lau equipment. Clip the coupon below, and mail it for free literature today!

TEAR OFF AND MAIL TODAY

LAU Blower Co.
934 E. Monument Ave., Dayton, Ohio

Without cost or obligation send me complete information on Lau Furnace Blower Equipment.

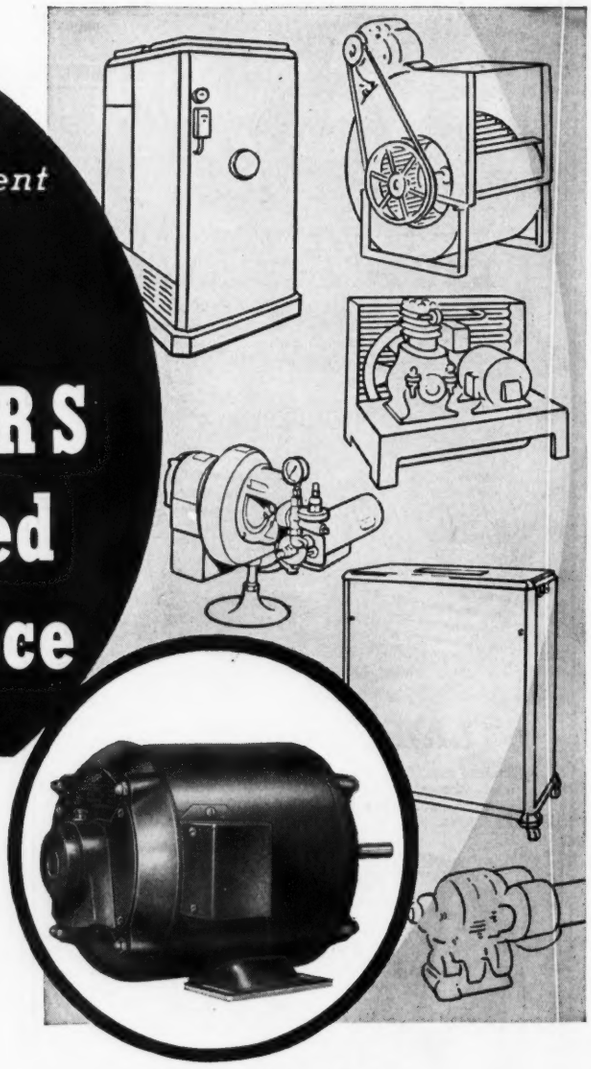
Name .....

Address .....

City ..... State .....

For Every Heating, Cooling or Air Conditioning Requirement

Century MOTORS Provide Specified Motor Performance



WHEN the characteristics of the motor accurately match the demands of the driven machine you get the highest efficiency and the most satisfactory results from any heating, cooling or air conditioning equipment.

Because of Century's extremely wide range of types and sizes, because of Century's years of specialization in the correct application of electric motors to fit the job, Century Motors provide *specified performance.* You can use Century Motors with complete confidence in their ability to do the job *right* — to make more sales for you, to keep your customers satisfied.

For many years Century has studied the problem of correct motor application in the air conditioning field. Century Motors have played a prominent part in the development of this great industry. Century extensive experience is always available to you upon request. Get in touch with your nearest Century Motor Specialist today. You'll find his counsel most helpful, valuable — and profitable.

CENTURY ELECTRIC CO.
1806 Pine Street . . . St. Louis, Mo.

Offices and Stock Points in Principal Cities

Consider these Features of Century Motors

Quiet Starting — no groans or annoying noises at starting that often are more disturbing than operating noises.

Quiet Running — true heating and air conditioning comfort must be quiet comfort — always.

For Hard to Start Loads — Century Motors have the ability to start and bring the modern compressor up to speed without overmotoring the running load. The same is true when properly applied to stokers and other appliances that start up under heavy loads.

Built-in Thermal Overload Protection — at very low cost. Protects against over-current and over-temperature. Popular ratings listed by Underwriters.

Extra Protection for Damp Basements—Century's new specialized insulation resists moisture. Gives added safety assurance in the presence of excessive moisture — especially during the season when the motor is idle.

Long Life Construction — large bearings, machined from phosphor bronze castings, provide greater safety to abnormal belt tension stresses. Unique bearing bumpers prevent annoying bumps from V-belt irregularity. Century's wool yarn system of lubrication (fractional sizes) lubricates for at least a year without attention.

Low Starting Current — where current limitations are a problem, Century Type RS Repulsion Start Induction Brushlifting Motors for single phase and Type AS Automatic Start for polyphase, reduce light flicker and give better results when lines are heavily loaded.

Century MOTORS

One of the Largest Exclusive Motor Manufacturers in the World

"LOOK, SAM! YOU GIVE ME THE OCTOBER GRIPES!"

SAM: What's that?

LITTLE GUY: It's a pain I get every time I see you losing an extra dollar of profit on your forced-air furnace jobs.

SAM: *Me*—lose an extra dollar?

LITTLE GUY: Yes, *you!* Don't you realize you've got a tremendous number of air-filter prospects?

SAM: G'wan!

LITTLE GUY: Don't you know that loads of your customers are *already* sold on changing air filters this fall?

SAM: Nope!

LITTLE GUY: Haven't you seen the big ads the Dust-Stop filter people are running in Life, Saturday Evening Post, Better Homes and Gardens, and American Home?

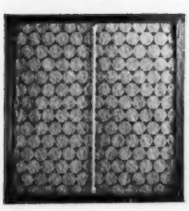
SAM: Yeh, but—?

LITTLE GUY: Listen, Sam! Those ads tell people to change air filters *regularly* to get all the advantages of clean, filtered heat. And practicaliy every blower and motor tune-up on your books is already using Dust-Stops.

SAM: *I* get it! All I gotta do is . . .

LITTLE GUY: . . . suggest changing filters. Phone 'em, or mail 'em the free postcards and envelope stuffers the Dust-Stop people have for you.

SAM: It's a cinch to make that extra dollar now—a lot different from the days when people didn't even know their forced warm-air furnaces *had* air filters!



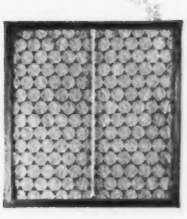
You can make a lot of extra money this year on

FIBERGLAS* DUSTOP* AIR FILTERS

*T. M. REG. U. S. PAT. OFF.

Manufactured by Owens-Corning Fiberglas Corporation, Toledo, Ohio

See Fiberglas at the Fairs—New York and San Francisco

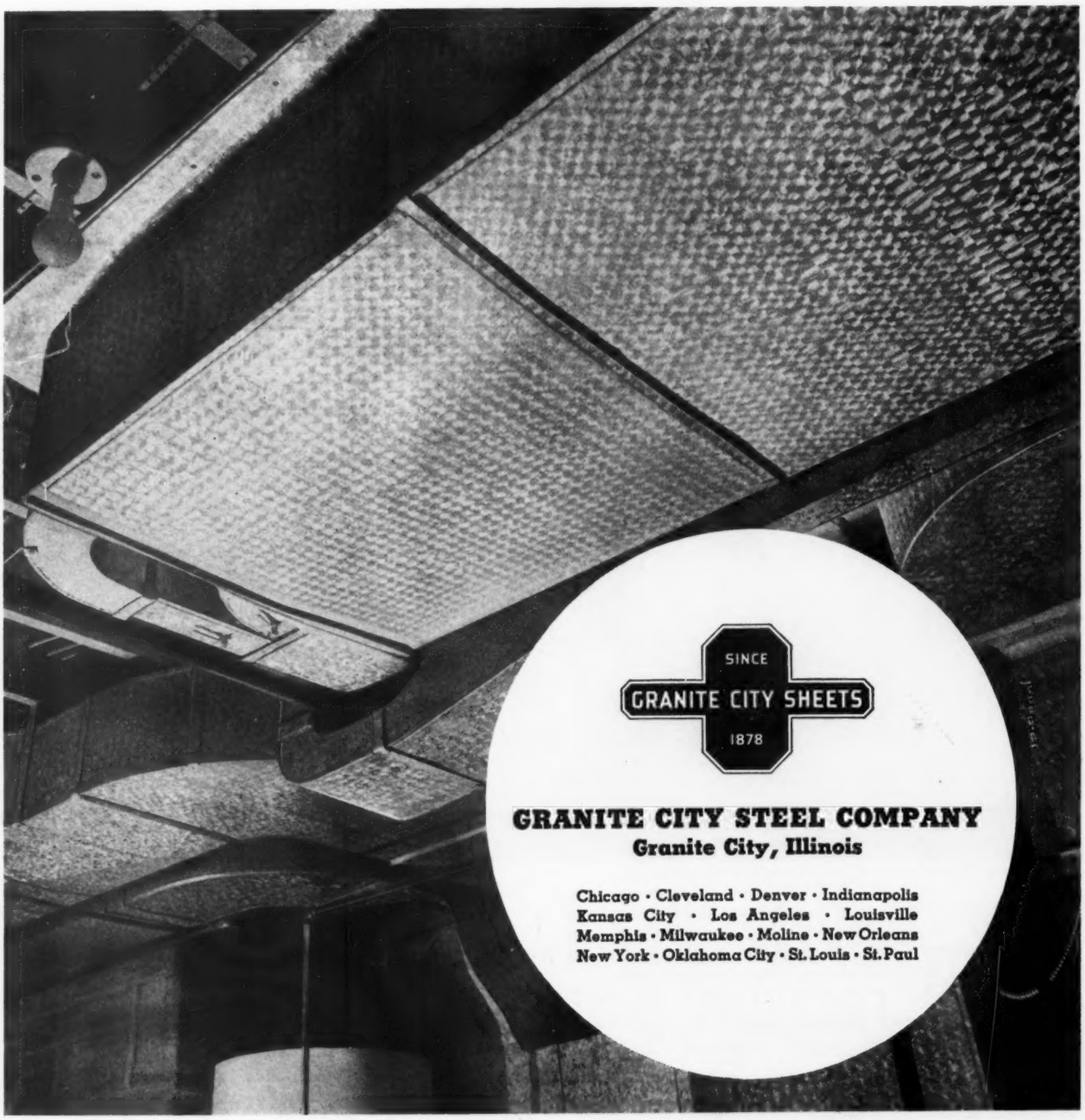


Satisfy your Customers

WITH GRANITE CITY GALVANIZED SHEETS

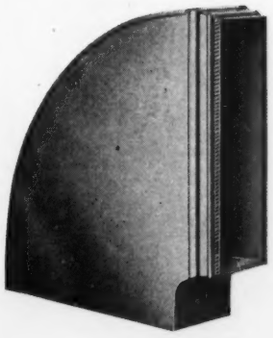
Duct work or other sheet metal fabrication done with Granite City Soft Forming Galvanized Sheets will please your customers—help your reputation—bring you new business. Because of the ease with which they can be formed, Granite City Galvanized Sheets enable you to turn out work of neat appearance that draws praise. The spelter does not chip off at bends. Spangles are even and bright. Sheets are truly flat.

You can depend on the uniformity of every lot of Granite City Soft Forming Galvanized Sheets because they are made under extremely rigid inspection and laboratory control. Base metal is highly refined. Spelter coating is even. Gauges and sizes are always accurate. For complete satisfaction for yourself and your customers, specify Granite City Soft Forming Galvanized Sheets. Your first experience will be convincing.


SINCE
GRANITE CITY SHEETS
1878
GRANITE CITY STEEL COMPANY
Granite City, Illinois
Chicago · Cleveland · Denver · Indianapolis
Kansas City · Los Angeles · Louisville
Memphis · Milwaukee · Moline · New Orleans
New York · Oklahoma City · St. Louis · St. Paul

HANDY PIPE

IS Really "Handy"— To Get and to Use!



During the busy fall days you want your orders filled RIGHT NOW — and you want pipe sections that go together with a snap and STAY properly fitted.

In order to give you every help, here is our jobber list. Order from the one you prefer—the one that gives you the best service and lowest freight cost.

HANDY PIPE JOBBERS GROUPED BY STATES

ILLINOIS

Alton
Beall Bros. Supply Co.

Bloomington
P. H. MaGirl Foundry & Furnace Works

Chicago
R. K. Carter & Co., Conway Bldg.

Decatur
Field & Shorb Co.

Galesburg
Willis Mfg. Co.

Jacksonville
Jacksonville Supply Co.

Monmouth
Maple City Furnace Co.

Mt. Vernon
Benoist Bros. Supply Co.
Mt. Vernon Furnace & Supply Co.

Quincy
McDonald Stove Co.

Rockford
Rockford Sheet Metal Co.

Rock Island
Rock Island Register Co.

Springfield
Berger Mfg. Division of Republic Steel Corp.
Hammond Sheet Metal Co.

INDIANA

Evansville
Ohio Valley Hdwe. & Roofing Co.

Fort Wayne
Schaab Roofing & Supply Co.

Indianapolis
Indianapolis Machinery & Supply Co., 1959 S. Meridian St.

IOWA

Burlington
Drake Hardware Co.

Ottumwa
Haw Hardware Co.

MASSACHUSETTS

Malden
David Gilman

MINNESOTA

Duluth
Duluth Plumbing Supplies Co.
Marshall-Wells Co.

Minneapolis
Roberts-Hamilton Co.

MISSOURI

Kansas City
The Meyer Furnace Co.

St. Louis
Aalco Furn. & Supply Co.
Berger Mfg. Div. of Republic Steel Corp.
Hammond Sheet Metal Corp.
Stockhoff Supply Co.

NEBRASKA

Omaha
Standard Furnace & Supply Co.

NEW YORK

Buffalo
Minet Heating Supply Co.

Rochester
Boiler & Furnace Parts
J. S. Carpenter, 250 St. Paul St.

NORTH DAKOTA

Grafton
J. M. Larson Warehouse & Fuel Co.

OHIO

Canton
McCurdy Furnace & Foundry Co.

Cleveland
Kinsner Supply Co.

PENNSYLVANIA

Pittsburgh
Demmler Bros. Co.

TENNESSEE

Memphis
Easley Sheet Metal Supply Co.

WISCONSIN

Appleton
Badger Furnace Co.

Fond du Lac
The MacIntyre Co.

Green Bay
Metal Service Co.

Milwaukee
Schwab Furnace & Mfg. Co.

F. MEYER & BRO. CO.

PEORIA **ILLINOIS**

"That's Great! - but what do you do with regular orders?"

ALLOYS
ANGLES, HOT ROLLED and COLD ROLLED
ARCHES (CORRUGATED)
BABBITT
BANDS and HOOPS
BARS, HOT ROLLED
ALLOYS (HR and CF)
COLD FINISHED
ELECTRIC HIGH CARBON STEEL
REINFORCING
BEAMS and C. B. SECTIONS
BEEF RAIL
BOLTS, NUTS, WASHERS, ALL KINDS
BORING and TURNING BARS and GRINDERS
BRACES, BOILER
CHAIN, ALL KINDS
CHANNELS
CHISELS
CHUCKS, STAYBOLT
CLAMPS, BOILERMAKERS
CLIPS, PATTERSON
CLEANERS, FLUE
CONDUCTOR PIPE
COPPER and BRASS
COUPLINGS, HOSE
CRAYONS, SOAPSTONE
CUTTERS
DARDELET RIVET and MACHINE BOLTS
DRILL RODS
EAVE TROUGH and FITTINGS
EXPANDERS, FLUE
FERRULES, COPPER
FLANGES, BOILER and TANK
FLOOR PLATES
GALVANIZED SHEETS, BARS, BANDS, ETC.
HANDLES, HAMMER
HEADS, TANK and FLANGE
HOISTS, HAND and POWER
IRON, STAYBOLT
LUGS, BOILER, TANK and SILO
MACHINERY, HAND and POWER
MANHEAD PLATES and FITTINGS
NAILS
PACKING
PAINT STICKS
PLATE STEEL, STANDARD QUALITIES
ABRASION RESISTING
COR-TEN and MAN-TEN
PLUGS, FLUE
RAILS and FITTINGS
REAMERS
SHAFTING
SHEETS
ABRASION RESISTING
COR-TEN and MAN-TEN
HOT ROLLED and UNIFORM BLUE
WELLSVILLE POLISHED
COLD ROLLED
STAINLESS STEEL
GALVANIZED and GALVANNEALED
LONG TERNE
CORRUGATED
U·S·S COPPER STEEL
SPRING STEEL BARS and SHEETS
STAINLESS STEEL
STRIP STEEL, CR and HR
TEES
TIRE, ROUND EDGE
TOOLS, HAND and POWER for BOILER and IRON WORK
TROLLEYS
TUBES, BOILER
TURNBUCKLES
VALVES, BLOW-OFF
WELDING ROD and WELDERS
ZEES

USS Scully Service

"A salesman from the Scully Twin Cities Warehouse was calling on a customer when his shop foreman came in and wanted 25 angles within an hour. The Purchasing Agent was peeved. But our salesman said we could make delivery. A phone call resulted in delivery of the material in 25 minutes—in fact before our salesman had left."

"OF course," said the Purchasing Agent, "you naturally wanted to impress me. But, what kind of delivery do you make on regular orders?"

Our representative was glad this question was asked. For each of the eight Scully Warehouses operates on the principle that customers always want their materials prepared and shipped at once. Promptness is the rule on all orders big or little. And when there's an unusual emergency Scully knows that unusual service is needed, so we act accordingly.

That's why thousands of customers all over the country depend upon Scully Service when they want steel, steel products, copper or brass.

Phone, write, or wire the warehouse nearest you. See for yourself why friendly Scully Service has made and held so many friends. And ask for our handy complete Stock List and Reference Book—it's free.

SCULLY STEEL PRODUCTS COMPANY

Distributors of Steel, Steel Products, Copper and Brass

CHICAGO · NEWARK, N. J. · ST. LOUIS · BOSTON · ST. PAUL—MINNEAPOLIS
CLEVELAND · PITTSBURGH · BALTIMORE

UNITED STATES STEEL

1 FINNED 2 TINNED

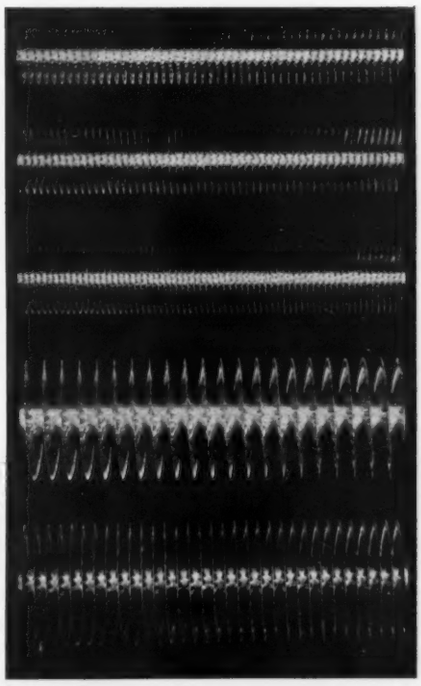
AEROFIN

The Non-Corrodible, Light-Weight, Fan System Heat Surface

2 METALS UNITED AS 1

Combining the rapid heat-transmitting qualities of copper with the advantageous corrosion-resistance of tin for

1. **INSTANTANEOUS HEAT TRANSFER**
2. **GREATER STRENGTH**
3. **LONGER LIFE**
4. **INCREASED EFFICIENCY**
5. **LASTING, SMOOTH SURFACE**



Engineers Everywhere Acclaim These Advantages

A PERMANENT METALLIC BOND
uniting two metals and two surfaces as one integral unit for instantaneous, uninterrupted, full-efficiency heat flow and long life; no gap for heat to bridge; no rusting to lower efficiency or create odors.

FINNED—
For greater heat transfer surface; seamless copper tube with fin helically wound around coil for continuous, highly efficient heat flow through bonded, unified coil and fin.
TINNED—
For corrosion-resistance and prevention of odors that occur when bare copper is exposed to moist air. Finned copper tube, by a patented hot-dipped process, is completely tin-soldered overall to make primary (coil) and secondary (fin) surfaces as one — A PERMANENT, NON-CORRODIBLE METALLIC BOND FOR "NEW-COIL" EFFICIENCY AND CONTINUOUS HEAT FLOW THROUGHOUT COIL LIFE.

CONSTANT HEAT TRANSFER COEFFICIENT
unaffected by long use due to tin surfacings, insures operating conditions being identical with design conditions.

SUSTAINED RATE OF AIR FLOW
throughout life of coil; no rust to roughen surface; no diminished air quantity after use; no building up of fan horse power.

PROTECTION AGAINST CORROSION
with a tinned, durable, smooth surface that will not deteriorate. No chance for electrolysis or oxidation between metals.

●

WHY COPPER TUBING? It's light, seamless, durable, sturdy. Made to rigid specifications. Transmits heat 8 times as fast as cast iron—ECONOMY PLUS!

WHY FINNED? Studies reveal extended fin surface multiplies heat transfer for more effective results. Tightly wound fin assures full heat transmission from tube to fin. MORE ECONOMY.

WHY TINNED? Full efficiency of extended surface is assured by tin bond.

Acclaimed right from its development almost two decades ago, Aerofin lightweight non-corrodible Fan-System Heat surface has steadily increased in acceptance due to its natural advantages resulting from design by Fan Engineers. . . . Engineers everywhere endorse these Aerofin coils. This confidence was built on years of successful installations under severe conditions in every climate. . . . To specify Aerofin is to eliminate doubt of results.

AEROFIN

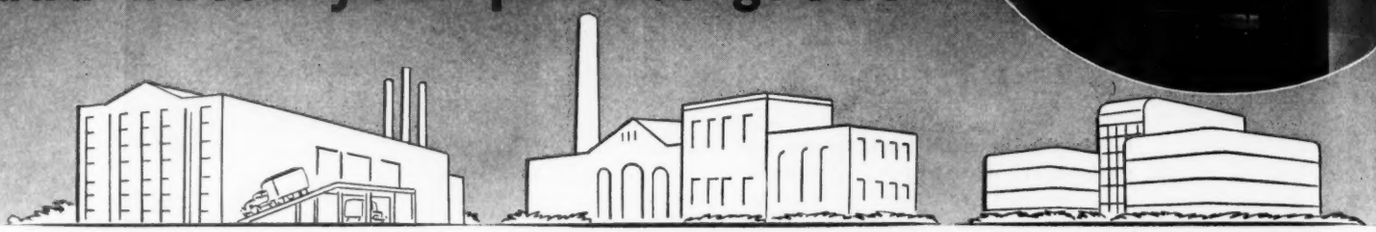
Is sold only by Manufacturers of nationally advertised Fan Heating apparatus. . . . List of such Manufacturers will be gladly furnished upon request to any office.

AEROFIN CORPORATION

410 SOUTH GEDDES STREET • SYRACUSE, N. Y.

CHICAGO DETROIT NEW YORK PHILADELPHIA DALLAS ATLANTA

Combine your craftsmanship with Enduro STAINLESS STEEL and watch your profits grow!



IN EVERY MEAT PACKING PLANT

Old metals are fast going out of meat packing plants in every part of the country — and ENDURO*, Republic's Stainless Steel, is being welcomed as a big time and money saver. You will find it easy to sell the sanitation of ENDURO, its ease of cleaning and its permanence for dozens of uses, including table tops, hand tools of many sorts, pans and trays for many purposes, sausage making equipment, chutes, conveyors, tanks, molds for pressing meat, and for any application where contamination of the meat must be avoided or where the presence of rust must be eliminated.

IN EVERY OLD AND NEW BREWERY

Brewmasters the world over have looked for a metal that would not contaminate or falsely flavor their beer — and that in turn would not be acted upon by it. ENDURO Stainless Steel ended this search, providing a metal that meets every need — including ease of cleaning. Visit the brewery in your town. Find out if they are having trouble caused by corrosion or if high cleaning costs on other metals are eating into their profits. Ask them to try ENDURO the next time a replacement of equipment is needed. Even a casual inspection will show you where it can be advantageous.

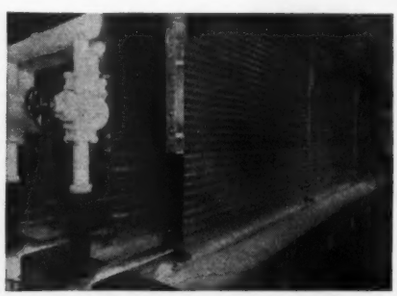
IN EVERY PHOTO-FINISHING PLANT

Photo-finishing plants have enjoyed an amazing boom in business since the introduction of the miniature camera and the home movie. Many new equipment units have been devised to handle profitably the volume of work that floods these plants. Sheet metal contractors have used ENDURO Stainless Steel, because it resists photographic solutions, to make trays, tanks, racks, reels, hooks, and ferrotyping plates. You, too, can bring in additional business by calling on the companies in your community that handle this class of work — and offering to be of service.

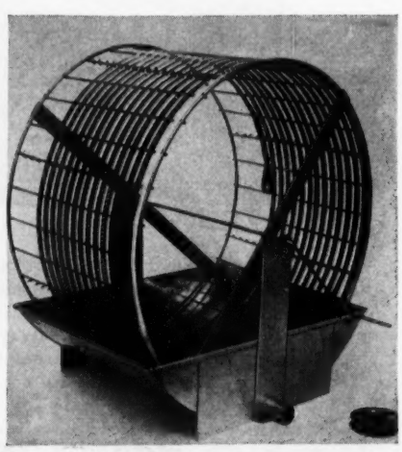
REPUBLIC STEEL CORPORATION

GENERAL OFFICES: CLEVELAND, OHIO • ALLOY STEEL DIVISION: MASSILLON, OHIO

ENDURO will not contaminate nor impart a metallic taste to meat.



The brewmaster who jealously guards his beer flavor specifies ENDURO.



Experience has shown that photographic chemicals do not react with ENDURO.

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AMERICAN ARTISAN

Volume 108 Number 10

War Effects

"What effect will the war in Europe have on the warm air heating - sheet metal contracting industry?" is a question asked with increasing frequency in the last four weeks. Most men have opinions; there is wide divergence in thought among laymen and forecasters; hence, it seems likely that no one man or group of men actually knows the answer.

These facts, we feel, are significant—but not conclusive. In most belligerent and neutral countries there has been wide industrial and agricultural expansion since the World War. Most of the key countries are much more nearly self supporting today than they were in 1914-1918. As a result of this, the United States today, under normal conditions of trade, supplies considerably less, proportionately, of the manufactured and raw materials needed in the world than we did in 1914. Granting that war consumes materials and products at a tremendous rate, the materials used by our industries should be little affected unless widespread destruction of belligerent industry occurs.

There is today in the United States a very large group of unemployed. Added to this group is another very large group which is not receiving wages which allow many luxuries. The result is that prices of raw and finished goods cannot climb very much without some form of price control being instituted.

The flurry of hoarding of the last six weeks subsided quickly. With every storage facility bulging with unused raw materials; with productive capacity equal to turning out many times the quantity of any one product that has been bought in the last ten years, there seems no sensible reason for hoarding. Tying up working capital in materials in the fear that materials will become scarce seems, right now, a very useless and senseless procedure in this industry.

So far as we can tell from statistics covering available raw materials and productive capacity there is absolutely no reason why there should be any scarcity of any material or any product used by this industry, nor should there be any reason for large increases in price. Small price increases will no doubt occur, but the reason will be psychological and not economic.

If warring nations turn to the United States for raw and finished materials there should be stimulation in all industries. Such increase in employment and perhaps in wages paid should, in turn, stimulate purchase of the equipment and services we offer. In our industry, therefore, business should be just as good, and maybe better, than during the last two or three years.

These facts, of course, are based on the assumption that the war will not go on for several years. If this is a long war, all above conditions will change. If this country enters the war, that move also will change every condition.

"Business as usual" a slogan suggested for the United States during this period of waiting to see what happens seems very wise counsel.

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A New Association

In the editorial pages of this issue there is a report of the secretaries' conference in Milwaukee, to which contractors were invited, and at which meeting it was decided to organize a new national association of "sheet metal, roofing, heating and air conditioning" contractors. As was plainly admitted at the meeting, the few contractors and the secretaries present did not, in any way, represent a true cross-section of this industry, yet the only way to start something is to start it.

The association proposes to hold its first annual convention in Cleveland, January 25, 1940. That day falls during the week of the air conditioning exposition and follows immediately the winter meeting of the National Warm Air Heating and Air Conditioning Association—both in Cleveland.

That there is need for a national association which can rise above the purely local problems of local associations and which can co-ordinate the work state associations are trying so hard to do—few will deny. How such a national association can be set up, where the money to operate will come from, what, specifically, the national association can do to solve the perplexing problems now confronting this industry must be thrashed out.

This thrashing out can't be done by remote control. Nor can it be done with wishful thinking. Hundreds of contractors have said that there should be a national organization. Some of their "reasons why" are vague and purposeless; other reasons are definite and possible. All reasons should be aired in a common meeting.

Why not, then, plan to attend the air conditioning exposition, the national warm air convention and the first annual convention of this new association? Such a trip will be the biggest dollar value of 1940.

A New National Association of Sheet Metal and Allied Contractors

ON June 15, 1936, secretaries representing the States of Michigan, Ohio, Illinois, Indiana, Wisconsin, together with secretaries of local associations and interested contractors met in Gary, Ind., for the purpose of determining whether or not some of the pressing problems of the sheet metal contracting industry could not be solved by co-operative effort through officers representing Mid-Western association and contractor groups.

From time to time since that first meeting in June, 1936, these same secretaries with secretaries of other state associations and local associations have been holding these conferences and co-ordinating the efforts of associations represented to the mutual advantage of all factions in the industry. Most prominent among the accomplishments of the group has been the securing from copper mills of more advantageous prices on small quantity orders.

Quite naturally, in view of the fact that the National Sheet Metal Contractors Association has been disbanded, it has been the hope of this group that eventually out of these conferences might come a sound and conservative basis for the organization of a new national association, which would be truly representative of the great industry of sheet metal work, ventilation, roofing, warm air heating and air conditioning. During the many conferences during 1936, 1937, 1938 and 1939, this idea of a national association has been discussed quite frequently.

Call For a New Association

Early in the summer of 1939, a call was sent out to all of the known state and local associations and contractor groups in these fields as well as to several hundred contractors. The call stated that the Secretaries' Conference would like to call a national meeting this summer for the purpose of discussing the advantages or disadvantages of a national organization. This meeting was held in Milwaukee, Wisconsin, on September 16, 1939. There were in attendance the state secretaries for Illinois, Michigan, New York, Ohio, Wisconsin, several local associations represented by secretaries or officers, and a number of prominent Mid-Western contractors. When the call was sent out, the request was made for suggested names for this new association and at several of the recent secretaries' conferences, suggested by-laws and a constitution were discussed.

At the Milwaukee meeting, it was decided through discussion from floor that the only way to get a National association started was to start and that instead of waiting until a truly representative and a large gathering of contractors could be brought together, those present should decide upon a name and a constitution with by-laws and to plan for a truly national association, meeting at some favorable place in the near future.

New Association Named

The name "Sheet Metal, Roofing, Heating and Air Conditioning Contractors' National Association" was selected by the assembly. The previously submitted constitution and by-laws was adopted tentatively with the understanding that secretaries having objections to certain parts of the suggested by-laws would be given full opportunity at the next meeting to present their objections and contractors who have not previously been given an opportunity to study the suggested by-laws and constitution could hear these articles of organization read and present their discussion, if any.

Next Meeting, January 25, 1940

It was decided to hold the next meeting of this new National Association in Cleveland on Thursday, January 25th, 1940, at some hotel to be selected by the convention committee. This meeting will be held during the week of the National Warm Air Heating and Air Conditioning Association convention in Cleveland and this same week will have in Cleveland, the biennial exhibition of the American Society of Heating & Ventilating Engineers and the annual meeting of the American Society of Refrigerating Engineers. It is hoped that by having the meeting during this week there will be a large gathering of contractors from all parts of the country to attend the air conditioning exhibition and the National Warm Air convention and those contractors attending, who are interested in national association of sheet metal contractors are invited to participate in this first annual meeting of the new organization.

Interim Officers

Officers elected to serve until the January 25th, 1940, first annual convention were:

President, F. E. Ederle, Secretary of the Michigan association; vice president, C. J. Meyers, Secretary of the New York State association; secretary and treasurer, P. L. Biersach, secretary of the Wisconsin State association.

The committee appointed to handle all matters pertaining to the first National convention in Cleveland was H. C. Bitter, chairman, New Secor Hotel, Toledo, Ohio; C. M. Gundlach, Sandusky, Ohio; C. J. Meyer, Buffalo, N. Y.; F. E. Ederle, Grand Rapids, Michigan. This same committee was given

the task of setting dues for the National association which discussion from the floor indicated should be approximately five or possibly ten dollars per year. The question of dues will be presented at the first annual meeting of this committee.

Contractors interested in this suggestion for the formation of a new National Sheet Metal Contractors Association are invited by the Secretaries' Conference to get in correspondence with any one of the officers mentioned above or the committee members listed and present in complete detail their ideas for the formation of this national association and for suggestions on problems which this National association can logically discuss for the general benefit of the industry.

90-Day Copper Quotations

In addition to the general proposition of forming a new National association of sheet metal contractors, C. J. Meyer of the New York State association, presented a complete resume of the present situation in sheet copper wherein mills and jobbers are refusing to extend quoted prices to contractors beyond a 90-day limit. Mr. Meyer pointed out that many contractors, particularly those submitting quotations on PWA and WPA work quite often find their quotation held up for many months until all matters relating to the project are finally decided upon and, as a resut of this situation, prices entered months previously may well be too low for present copper prices with the result that the successful sheet metal contractor finds when the contract is accepted that his prices for copper are considerably higher than the prices were when the bid was originally entered. Mr. Meyer said that he had received a number of letters from mills and jobbers indicating that under present unsettled conditions in the copper industry, it is impossible for mills or jobbers to quote prices which hold good beyond 90 days. Mr. Meyer suggested that it might be possible to work out some basis wherein a contractor would be guaranteed existing prices on a particular project with the material specifically charged to that one project. This material only would be supplied by the mill or jobber at the price quoted even though delivery was not called for by the contractor for several months. Mr. Meyer acknowledged that some contractors might seek to make a price coverall guarantee of such a situation wherein the contractor could draw sheet copper from time to time against his original order even though the withdrawals were not used on the particular project originally listed.

E. H. Walworth, Revere Copper and Brass, the only copper representative present at the meeting, stated that while he was not in any position to speak for the mills or jobbers, he did not feel that such a proposition would be impossible to work out and that so far as he could see contractors would have to take their chances with prices as quoted and as finally charged when the job was begun. As a result of the discussion a committee composed of George Harms and C. J. Meyer was appointed to draft a letter to be sent to the mills and jobbers. The letter declared briefly that in view of the abnormal conditions existing at the present time definite action on this proposition was deferred by the National Secretaries' Conference to a future meeting, at which meeting the Conference requested the co-operation of the mills and jobbers in arriving at some basis for mutual understanding.

Conditions Under Toledo Code

A brief analysis of the heating contractors situation in Toledo, Ohio, under the revised Toledo heating ordinance, was presented by H. C. Bitter, executive secretary of the Toledo association. Mr. Bitter explained how the original Toledo code covered gravity installation with a clause inserted which permitted the addition and revision of sections of the ordinance and that under this clause it was possible to change the original code to a new code including both mechanical and gravity warm air heating without having to submit the new mechanical heating sections of the ordinance to the city council for a complete and original discussion. Mr. Bitter pointed out that banks, real estate builders, building and loan associations generally were against the Toledo ordinance because the ordinance required installation and design somewhat beyond the customary Toledo practice.

Mr. Bitter also briefly analyzed the apprentice school in Toledo and said that the chief difficulty of the Toledo apprentice school (published in the May, 1937, issue of American Artisan) was the fact that under the present plan the school has a number of working mechanics taking the course who never will be able to assimilate the information presented and probably will never be graduated. This results in keeping a full registration and prohibiting the entrance of younger and new apprentices who might be able to complete the course of instruction offered.

The Conference was the guests of the Wisconsin State association and the Milwaukee Sheet Metal Contractors Association, whose hospitality was graciously acknowledged by the Conference.

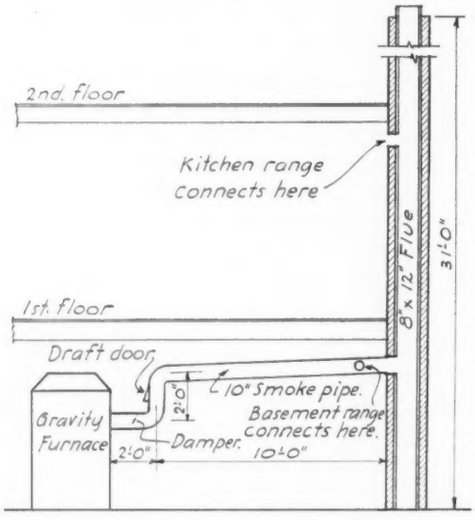
The formation of a new national association of sheet metal, heating and air conditioning contractors is bound to be a tremendous undertaking. The men who have started this movement can't possibly carry the task alone. Help and suggestions are needed. Contractors who want to help should get in touch with the officers and committee members listed above.

THE PROBLEM CORNER

Chimney Trouble

American Artisan:

We are having trouble with the chimney on a gravity furnace. The chimney flue for the furnace is 12 by 8 inches, 31 feet high. Into this same flue a kitchen range is connected from the first floor and another range in the basement is tapped into the furnace smoke pipe. (See sketch)



Both ranges seem to draw well but the furnace does not. Can you give us any information on amount of draft required and can you estimate the draft we probably are getting at the furnace?

E. P. E., North Dakota.

Reply by The Editors

Before we can give you any specific information on your chimney, we should know the grate diameter of the furnace and what is the type and size of coal being used.

Without having this information and assuming that your fire bed is 12 inches deep and your combustion rate six pounds of coal per hour per square feet of grate, and your smoke pipe hole in the chimney is 5 ft. above the grate as shown on your sketch, with three right angle turns in the smoke pipe, you will have a resistance to draft of approximately 2/10 of an inch, water gauge. This means that you should have a chimney about 8x12, 30 ft. high, unobstructed and without any other openings into the flue.

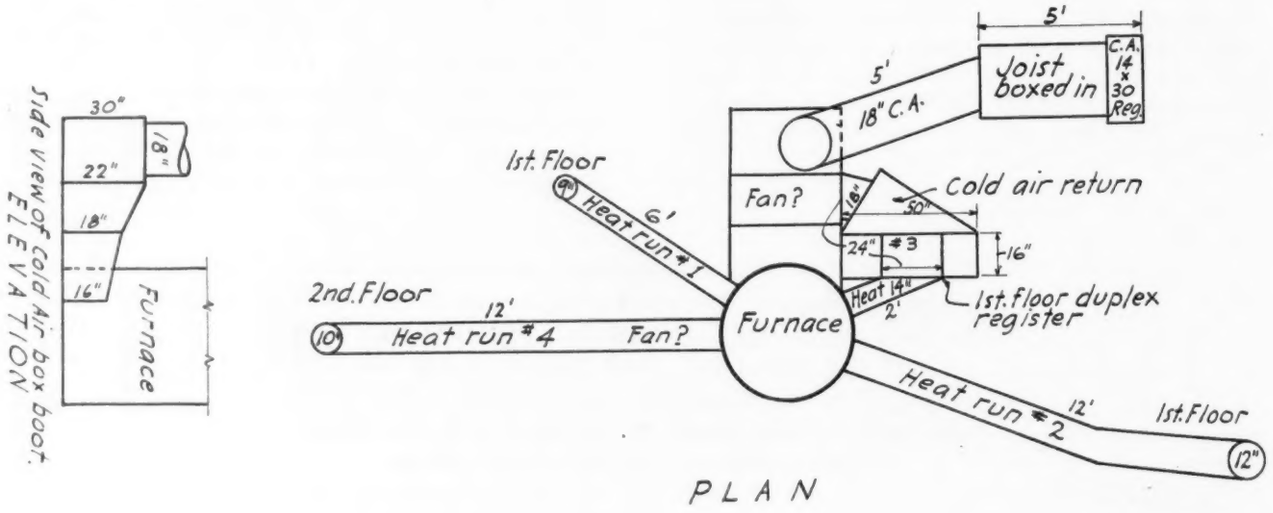
You may have a larger furnace and therefore need more draft; you may be burning a coal with a large percentage of fines and therefore need more draft. Every authority advises the furnace flue to be used for the furnace exclusively, whereas you have two openings in the flue and the chances are a draft gauge would show not over 1/10 of an inch of draft, or about one-half as much draft as you need to keep the furnace going.

One-Pipe Booster vs. Heat Robber

American Artisan:

In my own house the system shown in the sketch is installed. I would like to add either a booster fan or a blower as shown in the elevation. The large, single register cannot be changed. My problem is to put more heat through run number 4. The rest of the rooms all heat satisfactorily. This number 4 run serves a second floor room, has two bad right angle turns, and I know shows poorly by comparison with the other heat runs.

Would a blower or a booster fan built into the cold air boot as shown help or would a one-pipe booster be better?



If a regular blower housed to serve all heat runs and collect all returns will be best, I can rebuild the job. Heat circulation is fine on the first floor, but no good upstairs unless I shut off runs 1 and 3.

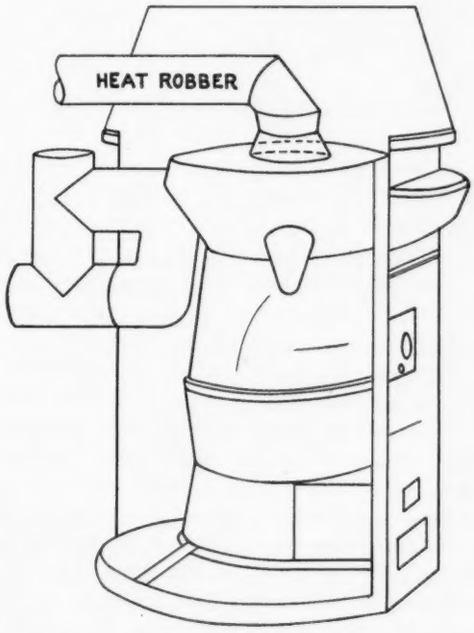
C. W. H., Penna.

Reply by The Editors

We have had some little experience with fans which are placed in warm air pipes, both in the pipe and over the face of the register. In one case where we ran temperature readings we found that the fan over the register did increase the overall room temperature considerably, but the fan in the room was too noisy to run it when the room was occupied.

On the other hand, a somewhat similar fan placed in the arm air pipe approximately 8 feet back from the register also gave out such an air whir that the noise quickly became objectionable.

We have had no experience with a booster fan placed near the bonnet of the furnace, and such a location might eliminate noise. However, you appreciate that these booster fans do not work against very much resistance and if your run No. 4 is quite long and has two 90-degree elbows, we are rather doubtful as to the results with the booster fan placed near the bonnet.



On the other hand, you do seem to have quite a complicated return air connection box, if we read your sketch rightly, and we do not believe that a blower will be satisfactory unless both of your cold air returns can be hooked in ahead of the filters. If this can be done, then our recommendation would be that you use a centrifugal blower which will not be noisy and will be positive in action. If you use the blower, you will have to baffle your furnace and you will probably have to put thimbles in all of the warm air pipes, these thimbles to be of the proper cross section area for the amount of air going to each room under pressure of the blower. You will not get satisfactory results by merely baffling the furnace casing and leaving the gravity pipes oversize.

Before you go to the expense of buying and installing a blower, since you have a fairly successful gravity system, why don't you try one of the many types of heat robbers which can be installed very quickly and cheaply on run No. 4? You probably remember the series of articles we ran on heat robbers in 1930 and 1931 and some of the results reported were surprising. If you are interested in the heat robber idea, we can probably find a few of the articles and send them to you.

We are mailing your letter to G. A. Voorhees of the Furblo Company, who has probably had more experience with this type of remodeling than anyone in the country. He may have some suggestions better than ours.

Wrote Mr. Voorhees:

American Artisan has referred to me the very interesting problem outlined in your November 17th letter and, while I am naturally interested in the sale of blower equipment, I am not so sure that you need a blower—or even a propeller fan—to take care of run No. 4.

Before offering any definite suggestions, I would like to have the following information:

What make and number (size) of furnace are you using?

What are the dimensions of the wall stack in question, and approximately what is its length?

What is the basement depth from floor to bottom of first floor joists?

What is the total height of the furnace casing from floor to top of hood?

A reply envelope which requires no postage is enclosed for your convenience.

G. A. Voorhees.

After receiving answers to the above G. A. Voorhees, Furblo Co., said:

I think you can take care of the second floor run with which you have had trouble, by extending the leader inside the furnace bonnet with an elbow on the end, and perhaps a funnel shaped fitting between the lower end of the elbow and the top of the cast radiator as indicated by the enclosed sketch.

Although I have never used this on a MOORE self-cleaning radiator, I have used it a good many times on the conventional ring radiator type of cast furnace, and in gravity heating it helped a lot in taking care of hard-to-heat rooms.

In fact, we are using this identical arrangement to insure delivery of heat to an office room connected with the FURBLO warehouse at Indianapolis. A pipe was originally run from the bonnet to the office room in the conventional manner and, while it delivered some heat, it didn't deliver enough unless the blower was running.

The office room was often used during the evenings and Saturday afternoons, when it was not necessary to heat the rest of the building, and we didn't want to run the large blower continuously just for heating this small room. The extension of the pipe into the bonnet to pick up the heat that came up through the center opening of the radiator made it easily pssible to warm the office room when the blower was not operating.

And the reader reported:

I revamped the upstairs run on my job as per your sketch, only in addition I put a partition extending inside of hood on each side of the elbow turned down. And does it work!

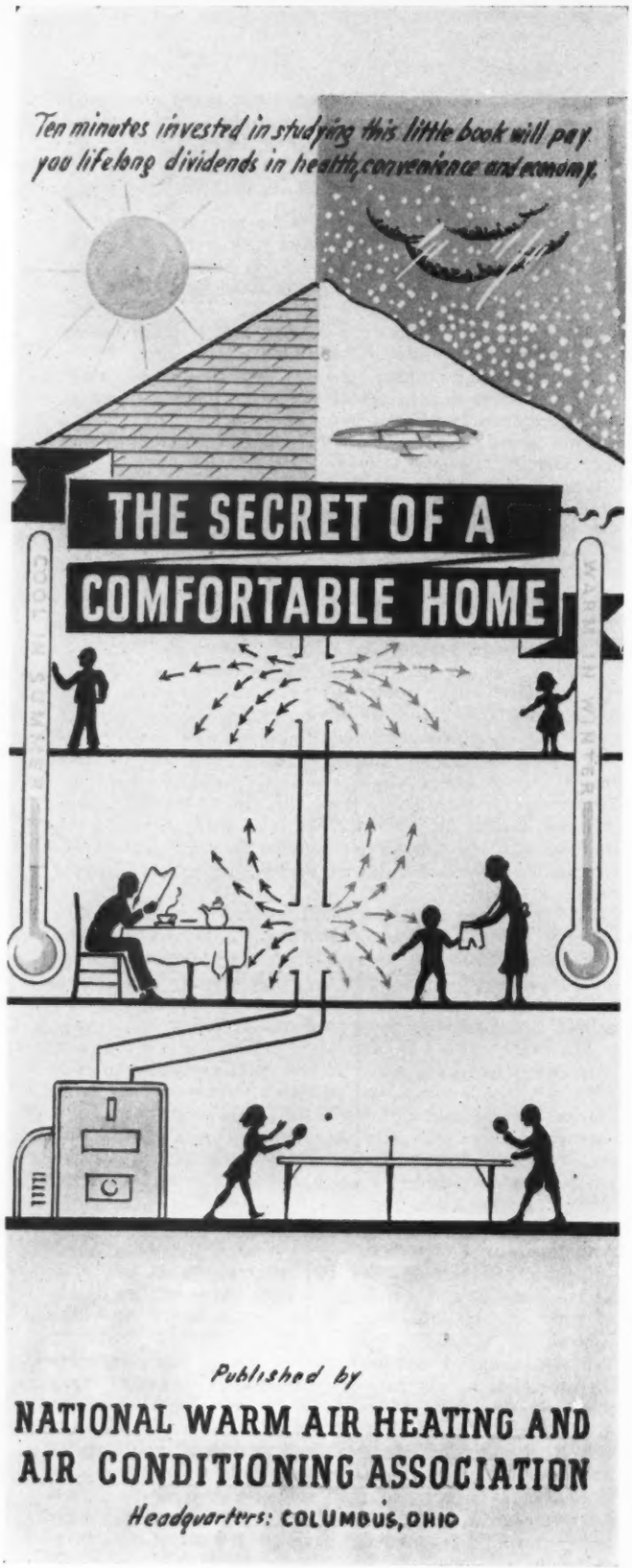
I also changed another job for one of my customers likewise and the results were marvelous. I want to thank you, and American Artisan, too, for your so kind efforts and interest. I have always been an admirer of yours and Mr. Neubecker and have read and studied all your articles and books. Ours is a small town with an oversupply of "hatched up," "botched up," rule-of-thumb heating jobs, but some of us still live in hopes for it. New jobs have been scarce, so I personally have put my stress on the revamping and have made a living at least and incidentally kept my nose above water.

And in conclusion Mr. Voorhees replied:

I am certainly "tickled pink" to know that the suggestions have solved so successfully the trouble you were having with your job and that you have also applied this on a similar job for one of your customers.

Just had a letter from American Artisan kidding me because I made the recommendation I did regarding your job instead of urging you to install a blower. I don't like to overlook a chance to sell a blower but, on the other

(Continued on page 102)


Ten minutes invested in studying this little book will pay you lifelong dividends in health, convenience and economy.
THE SECRET OF A COMFORTABLE HOME
Published by
NATIONAL WARM AIR HEATING AND AIR CONDITIONING ASSOCIATION
Headquarters: COLUMBUS, OHIO

Good Ammunition —Don't Waste It!

By Harry M. Hitchcock, B.Sc.
Editor, Information Bureau, N. W. A. H. & A. C. Assn.

INASMUCH as the "Secret of a Comfortable Home" booklet just published by the National Warm Air Heating and Air Conditioning Association is aimed straight at the ultimate consumer the first question it suggests to the furnace dealer is—"How can I best use it to promote my own consumer sales?" More particularly, the problem is one of distribution—how best to place this piece of advertising in the hands of those who are now, or soon will be, in the market for new homes or for home improvements.

It should not be necessary to remark that the purpose of this booklet will not be fulfilled unless it is read by a substantial number of American home owners. The booklet was not written as an academic treatise; it was written, and published, to help people buy, intelligently, increased home comfort through warm air air-conditioning; and of course it won't help them if they don't get a chance to read it.

The first thing that should be borne in mind by the dealer who has placed an order for booklets and had his own imprint put on them, is the fact that this isn't something to be scattered broadcast without discrimination, like a super-market throw-away. There are around ten million, probably more, private residences in America that may be considered prospects for home air conditioning. The first edition of the booklet was just one hundred thousand; which means that each copy can reach only one in a hundred of the total possible audience. If you are only going to talk to one prospect in a hundred, you ought to be fairly sure the one you pick is a real prospect, and a good one.

Just how good is your present prospect list? Can you pick from your list a number of people, corresponding to the number of booklets you have to distribute of whom you can say that you *know* they are actively interested in home air conditioning and would be glad to read a worthwhile booklet about it?

If you cannot do this, it will be well worth your while to precede your distribution with a bit of investigation. In fact, the more of these booklets you hand in person to people with whom you have personally talked air conditioning, the better your results will be. It is hardly necessary to say that no copies should be given out except to people who are directly and immediately interested in putting in warm air heating in their present homes or the new homes they are planning.

What is more, any person to whom it is worth your while to give a copy of the booklet, is worth following up. Go around again some evening two or three days later, or at the very least send each of them a personal letter, to ask them if they have read the booklet and whether or not they would like, either now or at some definite future date, to talk about modern air conditioning for their homes.

Gravity and Mechanical Heating Code, With Licensing, of Columbus, Ohio

Part I of this code was published in the September issue. The concluding part 3 will appear in November. This ordinance is one of the shortest codes so far reviewed in this series published in American Artisan. Being short, this code, in our judgement leaves much to the discretion of the inspector. Also, some city attorneys have ruled that citing Industry Codes instead of specifying directly, is not legal.

Permits

Section 5. a. It shall be unlawful for any person, persons, firm or corporation to install or replace any heating unit or to add any warm air outlets unless a permit is obtained therefor by the holder of a license to do such work, or by a firm or corporation employing a holder of such license; such permit shall be obtained by making application therefor at the office of the building department of said city; (however, work done by an owner on his own residence may be subjected to the approval of the heating inspector) with such application there shall be submitted specifications covering such work for the approval of the inspector of heating; and if said specifications are found by such inspector to comply with the requirements of this ordinance or any other ordinance of this city governing such work, or when said specifications are modified or supplemented so as to conform thereto, then said inspector shall mark the same "approved for permit"; and a permit to perform such work in accordance with such specifications shall thereupon be issued by such inspector on the payment of the proper fee therefor.

b. The fee for permits issued for such work governed by this ordinance shall be two dollars for each new furnace installed plus twenty cents for each warm air outlet connected therewith; provided that the fee for replacement of any furnace on which existing outlets are unchanged shall be two dollars, plus twenty cents for each new outlet, if any. Where alterations consist only in the addition of warm air outlets a fee of twenty cents shall be charged for each such outlet, provided a minimum fee for such alteration to any heating plant shall be fifty cents. Provided, further, the maximum fee to be charged for any furnace shall be seven dollars and fifty cents.

c. Wherever any work or project governed by the provisions of this ordinance and for which a permit has been issued as provided herein, is being performed or carried on in violation of any of the provisions of this ordinance or any other ordinance of this city governing such work, it shall be the duty of the inspector of heating to post a printed notice to "stop work" signed by the inspector, on the premises where such work is in progress; and to notify anyone in charge of such work on the premises of such stop order; after the posting of such notice, it shall be unlawful for any person, persons, firm or corporation to do any further work in such project until such time as the defects or violations of any such ordinance have been eliminated to the approval of the Inspector and said "stop work" sign has been removed by him; provided, however, that no "stop work" order so posted shall affect work not governed by any such ordinance except where the progress of any such work would interfere with inspection of work governed by any such ordinance.

Section 6. Any applicant for a permit hereunder or any other person directly interested who is aggrieved by any decision of said inspector in the execution of his duties, may appeal from any such decision to a board of appeal which shall consist of three persons, two of whom shall be holders of licenses under this ordinance and one of whom may be an installer of equipment governed by this ordinance; one of whom shall be chosen by the party taking the appeal, one by the inspector, and the third chosen by the other two members; the appeal shall be taken by the person aggrieved giving written notice of such appeal to the inspector at the office of the building department within twenty-four hours after such decision is made by said inspector. The selection of the members of such board shall be made at once, said board shall meet within forty-eight hours after the giving of such notice, and shall render a decision within three days thereafter. Any interested party, including said inspector, shall have the right to present the case to such board, whose decision shall be final. The members of such appeal board shall serve without pay.

Section 7. General Provisions. Inspector to have tests, inspection, etc.; all construction, alteration and repair, hereafter, within the city of Columbus, of heating and winter air conditioning plants and equipment, subject to regulation by the provisions of this ordinance or any other ordinance of this city governing such work in or for buildings of all classes, shall be done subject to the approval of said inspector.

It shall be the duty of the inspector to enforce and cause to be enforced the provisions of this ordinance and all other ordinances of this city relating to gravity, warm air heating systems or winter air conditioning

systems and to supervise all necessary tests and make all necessary inspections of heating and winter air conditioning plants and equipment installed thereunder, and said inspector is hereby given full authority to pass upon and either approve or disapprove any material or device, not specifically provided for in this ordinance, proposed to be used in any heating or winter air conditioning installation for which a permit is required, to require such tests to be made as may be necessary to determine the tightness of any warm air heating installation or of any portion thereof or of any sheet metal ducts or pipes connected therewith, and to require the immediate removal of any material or construction found to have been so installed as to conceal or cover up, before its inspection and approval by him, any newly installed portion of any heating or winter air conditioning system or plant.

Section 8. Inspections and Tests. Notice to be given by Contractor. When: Unlawful to cover up work before inspection: The heating or winter air conditioning contractor shall immediately notify the department, upon the completion of the installation, that work for which a permit has been issued as required by this ordinance, is ready for inspection and test, in the case of a winter air conditioning installation; or for inspection, in the case of a warm air installation, by registering the number of the permit and the location of the work in the inspection order register book kept for that purpose in the office of the inspector.

In any new building and in any new addition to an older building, immediately upon the completion of those portions of the installation which are thereafter to be concealed or covered up, in any heating or winter air conditioning installation for which a permit has been issued as required by this ordinance the heating or winter air conditioning contractor shall notify the department, in the manner above provided for, that said portion of the installation are ready for inspection and test, if it be a winter air conditioning installation, or for inspection, if warm air. No person shall cover up or conceal any portions of work until inspected. Inspection shall have atttached to said piping a notice stating that the same has been approved. Any unauthorized person who shall remove any such notice or cause the same to be so removed, and any person having charge of the construction of such new building or addition, or any person, who covers or conceals, or causes to be so covered or concealed, any of such portions of such heating installation before the same shall have been approved by the inspector, shall be subject upon conviction thereof, to the penalty herein provided for any violation of this ordinance.

Section 9. Minimum Requirements: the provisions of this ordinance shall be held to be minimum requirements adopted for the protection of the health, welfare and safety of the community.

Section 10. Replacement: Any warm air furnace, blower, winter air conditioning equipment or any appurtenance connected with any of the above, installed to replace any existing equipment of like nature in any existing plant or system shall be of such capacity as would be required under this ordinance where such furnace, blower, winter air conditioning equipment or appurtenance to be installed for use in connection with a new plant or system designed, as would be required by this ordinance, to meet the heating or winter air conditioning requirements for such building.

Provided, however, that, if in the opinion of the inspector it would be impracticable or would work an unnecessary hardship to require a complete compliance with the foregoing requirements, a warm air furnace, blower, winter air conditioning equipment or appurtenance, based as to capacity on the connected load, may be installed to replace any existing equipment of like nature.

Section 11. Alterations, additions, and repairs.

a. Alterations: Any alterations hereafter made to an existing heating or winter air conditioning system or plant, in or for any building, shall be made in conformity with the requirements of this ordinance, or any other ordinance of this city relating thereto, insofar as may be practicable, in the judgment of the inspector, without impairing the efficient operation of the system as a whole, or any portion thereof.

b. Repairs: Repairs to any heating or winter air conditioning equipment shall be made in such manner as to restore such equipment, as near as is practicable, to its original condition. Such repaired equipment shall be subjected to such tests as may be required, in the opinion of the inspector, to satisfactorily demonstrate its ability to meet the service requirements to which it may normally be subjected.

Section 12. Controls: Winter air conditioning systems hereafter installed shall be equipped with automatic controls.

a. Coal Fired Winter Conditioning System: Thermostat is required and must be accompanied by a high limit and blower control.

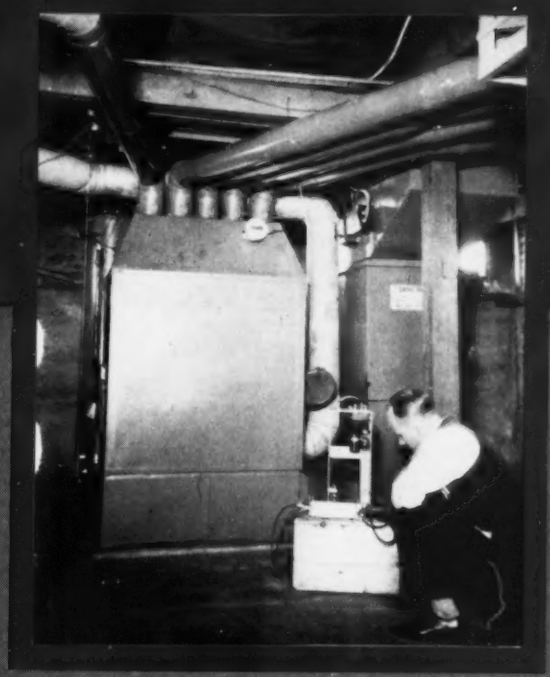
b. Gas fired winter air conditioning system shall employ a thermostat to control room temperature, and a high limit control. Either a thermostat pilot, so constructed and adjusted that no gas can flow through the main burner unless the pilot flame is burning, or some other similar type of safety device serving this same end, shall be employed. The operation of this safety device shall not depend on the closing of an electric circuit to shut off the main gas supply. A gas pressure regulator shall be installed on all gas fired furnaces and shall have a vent pipe.

Section 13. Shield: Any furnace, the casing top of which shall come within twelve inches of combustible floor, ceiling or joist shall be protected by a metal shield, extending not less than eighteen inches beyond the casing of said furnace. This shield shall be suspended at least two inches below woodwork, allowing free air space between shield and woodwork. No furnace casing or top, coming nearer than six inches of ceiling or joist shall be allowed in any case. All metal casing caps to be covered by not less than two inches of asbestos cement.

[To be continued]

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING SECTION



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Automatic Anthracite Stokers

By Paul A. Mulcey

Assistant Director, Anthracite Industries Laboratory
Primos, Delaware County, Pa.

THE development of the underfeed anthracite stoker, which offers the important qualities of economy, dependability, cleanliness, safety and uniformity of performance proceeded rather slowly at first as compared with its competitors, the oil and gas burner. In the past few years, however, there has been a rapidly increasing momentum in the stoker industry. Now the public is learning that the application of modern engineering to the use of an old fuel has produced a most practical source of automatic domestic heating.

Because of the burning characteristics of the fuel, underfeed stokers for hard coal are basically extremely simple. Combustion takes place as a continuous process instead of going through various complicated stages as do most other fuels. For example, anthracite contains no tarry material hence it does not tend to cake when first exposed to high temperatures. Each particle maintains its shape, thus simplifying the problem of bringing air in contact with the fuel.

The domestic anthracite stoker is built up of five main parts each having a definite function to perform:

Principle Stoker Parts

1. The coal conveyor system brings fuel from the bin or hopper and delivers it to the point at which burning takes place.
2. The ash conveyor system removes the solid products of combustion to a pit or ash receptacle. In some stokers this conveyor is omitted for the sake of simplicity and is replaced by a pit located beneath the burner and into which the ashes drop by gravity.
3. A blower and accompanying duct work supply air to the burner.
4. A combustion retort which is the center of activity and the point at which the combustion reaction takes place. It is here that the coal and air are brought together in the manner best calculated to give good combustion results. (See illustration on page 47.)
5. A drive system comprising a motor, speed reducers and linkages necessary to drive the various moving parts. Fig. 1 illustrates somewhat diagrammatically, the various components which we have mentioned and their relation to each other.

Stoker Types

Underfeed stokers for anthracite may be classified under three main divisions. First division is that which differentiates between the point from which coal is conveyed to the burner. The earliest type of anthracite stoker was one feeding coal from a hopper to the fire, it being necessary at regular intervals to fill the hopper by hand. The hopper feed stoker is still used to a considerable extent, particularly in large installations where an attend-

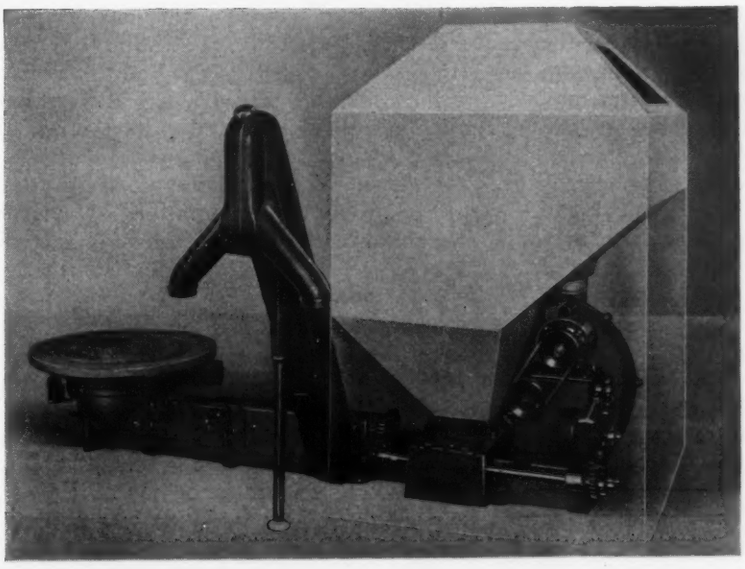


Fig. 1—Typical anthracite stoker showing the coal hopper, gear box, coal tube, retort (agitating type), ash removal conveyor (hopper type).

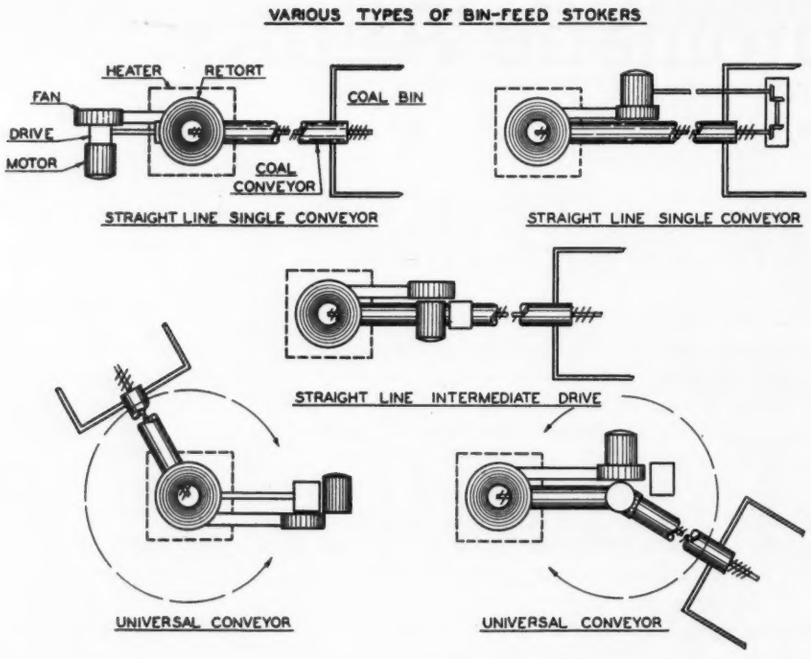


Fig. 2—Bin feed stokers are supplied in several types. The diagrams right show several arrangements of coal bin- conveyor-retort assembly. This flexibility satisfactorily meets practically every arrangement of basement equipment.

ant is available to keep it filled. Fig. 1 illustrates this type. By far the majority of present day installations fall into the second type—the bin feed burner. Here there is no necessity for shoveling coal by hand nor, as a matter of fact, for the consumer to even see the coal. There are numerous types of bin feed conveyors ranging from the simpler straight line models to the more complicated "universal" machines.

The second method of classifying anthracite stokers depends upon different methods of ash removal. We may call these the "mechanical" and "gravity" methods. In the former, the ashes reaching the edge of the retort are agitated in such a manner as to cause them to drop into the ashpit. Here they are picked up by a conveyor which removes them from the ashpit and either drops them into a pitted can outside the boiler or elevates them in order to deposit them in an ash receptacle located at floor level.

Gravity type ash removal consists in allowing the ashes to fall off the edge of the retort by their own weight and directly into an ashpit. The latter may have sufficient capacity for only one bushel ash can or may be a large seasonal pit from which the refuse is removed at intervals. There are, of course, burners having a combination of mechanical and gravity ash removal. For example, an agitator may assist in removing ash from the retort, but once this is accomplished, the ashes may merely drop into a pit such as has already been described.

The third method of classifying anthracite burners is according to the method of firing control. As compared to the other two, this division is much less important, and is not frequently used. Practically all domestic anthracite stokers fall into the first class, defined as "intermittent" burners. Actually there is no such thing as an intermittent burner for anthracite, since there must always be a sufficient evolution of heat to maintain the ignition temperature. The intermittent type of burner is operated by a room thermostat or other control so that combustion continues until the input requirements are satisfied. At this time the stoker ceases operation and the fire becomes inactive, burning at an extremely low rate. The so-called "continous" type of stoker is controlled in such a manner that the mechanism is always in operation, modulating the fire between a high and a low combustion rate with or without several intermediate steps.

Conveyors

Coal conveyors are of two general designs, by far the more important being the screw type conveyor. This consists of a shaft carrying a spiral flight either welded or cast integral with it so that when rotated the material contained is moved in the direction parallel to the axis of the tube. The "plunger" type conveyor consists of a series of cast cone shaped elements protruding one from another which when moved forward and backward through a short distance cause material surrounding it to move in a direction parallel to its axis.

It is reported that approximately 60% of anthracite burner sales are of the bin feed type. This figure is probably conservative. Nearly all stoker manufacturers have bin feed models available, and as time goes on it is predicted that the hopper type will be more and more limited to special applications and large installations.

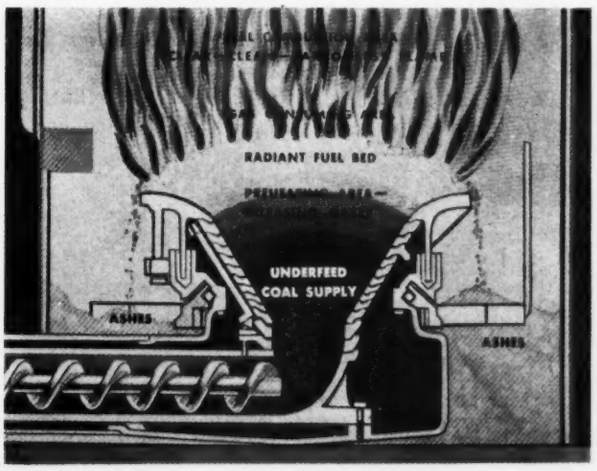
Bin feed stokers are of many different designs covering a wide range of adaptability. Fig. 2 shows the various general types of bin feed conveyors available. It can readily be seen that each has certain advantages with respect to relative location of the heater and coal bin. There is at least one model of anthracite bin feed stoker to take care of practically every conceivable cellar layout.

The removal of ashes may be accomplished mechanically or by gravity. Approximately 80% of stokers now sold are of the mechanical ash removal type indicating that, in general, it has been more satisfactory for the manufacturer to handle the ash problem by standardized mass production design. The conveying of ashes to conveniently located ash receivers on the cellar floor is naturally a strong selling point. On the other hand, in spite of the additional installation problems involved, the use of gravity ash removal has the primary advantage of materially reducing the number of moving parts subject to wear and possible breakdown. In addition, the convenience of having the ashes dropped directly into a container is, of course, available. Ashpits of size adequate to hold a full season's supply or any fraction thereof are not only practical and convenient, but are being used in a great many installations.

Mechanical ash conveyors may be of the screw, plunger, bucket, scraper, or a combination of types.

Retorts

Anthracite retorts may be classified either according to the method of ash removal or according to the type of tuyere. By the former classification we would have gravity or spillover retorts corresponding to the gravity ash removal systems already mentioned, and mechanical or ash agitator retorts consisting of those having rotating firepots, rotating scrapers, "clipper rings," or other devices for mechanically assisting elimination of refuse from the retort.



Cross section of the retort in an anthracite stoker showing zones of fuel burning, air passages, and path of ashes after fuel is consumed.

There are two main classes of retorts in terms of tuyeres: (a) ring type tuyeres (retort made up of a series of cast-iron rings) and (b) pin hole tuyeres (retorts cast in one piece or segmentally with small round holes distributed throughout the castings). A third type of tuyere also used to a limited extent is the deflector type in which air passes into the fire through a radial slot in the burner surface and strikes a series of deflectors which cause it to flow parallel to the tuyere surface, thus resulting in considerable diffusion of the air before it actually passes into the fuel bed.

A certain amount of the fine coal which passes into the retort may drop through the tuyeres into the windbox. The pin hole type and the straight ring type usually require a manual or automatic fines release to permit this material to be dropped out of the air chamber. Other tuyeres such as the "step down" ring type are practically free of fines and therefore do not necessarily require a cleanout.

Operation

The underfeed principle of combustion is the basis for the modern domestic anthracite burner. Coal is fed from below into the retort which has the general shape of a shallow inverted cone. The actual cross-section of the retort surface is generally slightly curved. The retort is made up of an inner surface which comprises a series of cast-iron rings or plates. Around this is an air chamber which is kept under a slight pressure and from which air passes into the fuel bed through a series of tuyeres or ports which may be in the form of slots or circular holes. A circular area around the outside of the retort is devoid of tuyeres and is known as a "dead ring."

The coal rising nearly vertically, passes into the ignition zone where jets of air from the tuyeres maintain combustion. As it passes upward and outward, the combustion reaction is completed and only the ash and a very small portion of unburned carbon remains. As it passes over the dead ring, the ashes are cooled and combustion is terminated. The purpose of this inactive zone is to maintain an air seal and also to permit as complete a burning-out as possible.

The composition of Pennsylvania anthracite is such that its burning characteristics are very simple. After ignition has taken place, the combustion reaction is uniform and little change occurs until all of the combustible material is consumed. Since there is no coking or caking of anthracite and in most cases clinkering may be satisfactorily controlled, the retort is self-cleaning. The ashes are discharged continuously in small fragments so that no shut-down is required for its removal.

[Part 2 will follow.]

This article is one of three. The series will discuss the merits of anthracite coal burners, the characteristics of various types of stokers, advantages of anthracite as a fuel, and some of the installation do's and don't's. Questions are invited.

Three-Zone Installation

—Zoned Vertically—

Using Two Furnaces and One Boile

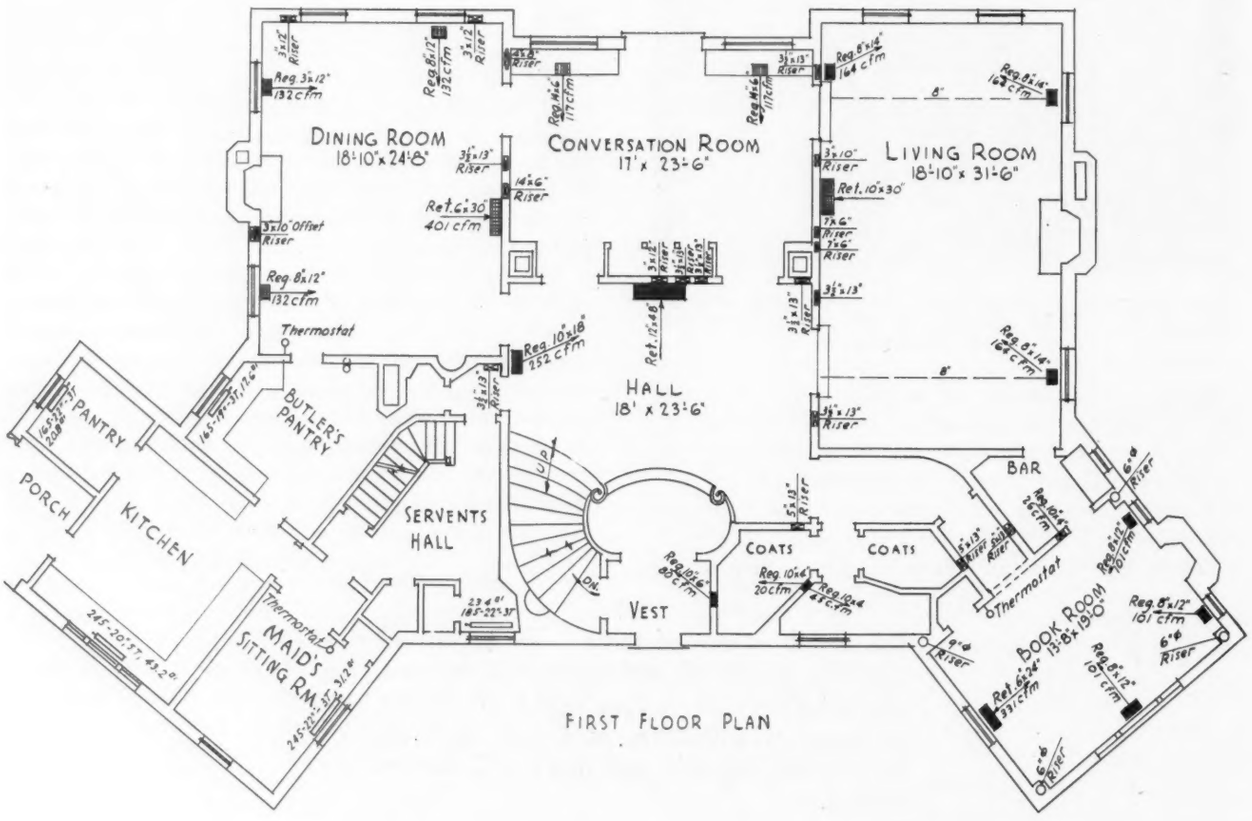
THE floor plans and details accompanying this job description illustrate a trend in large house air conditioning in and around Boston. The installation was made by the Trask Heating Company, Boston, and the Trask contract included the boiler and radiation as well as the air conditioning system.

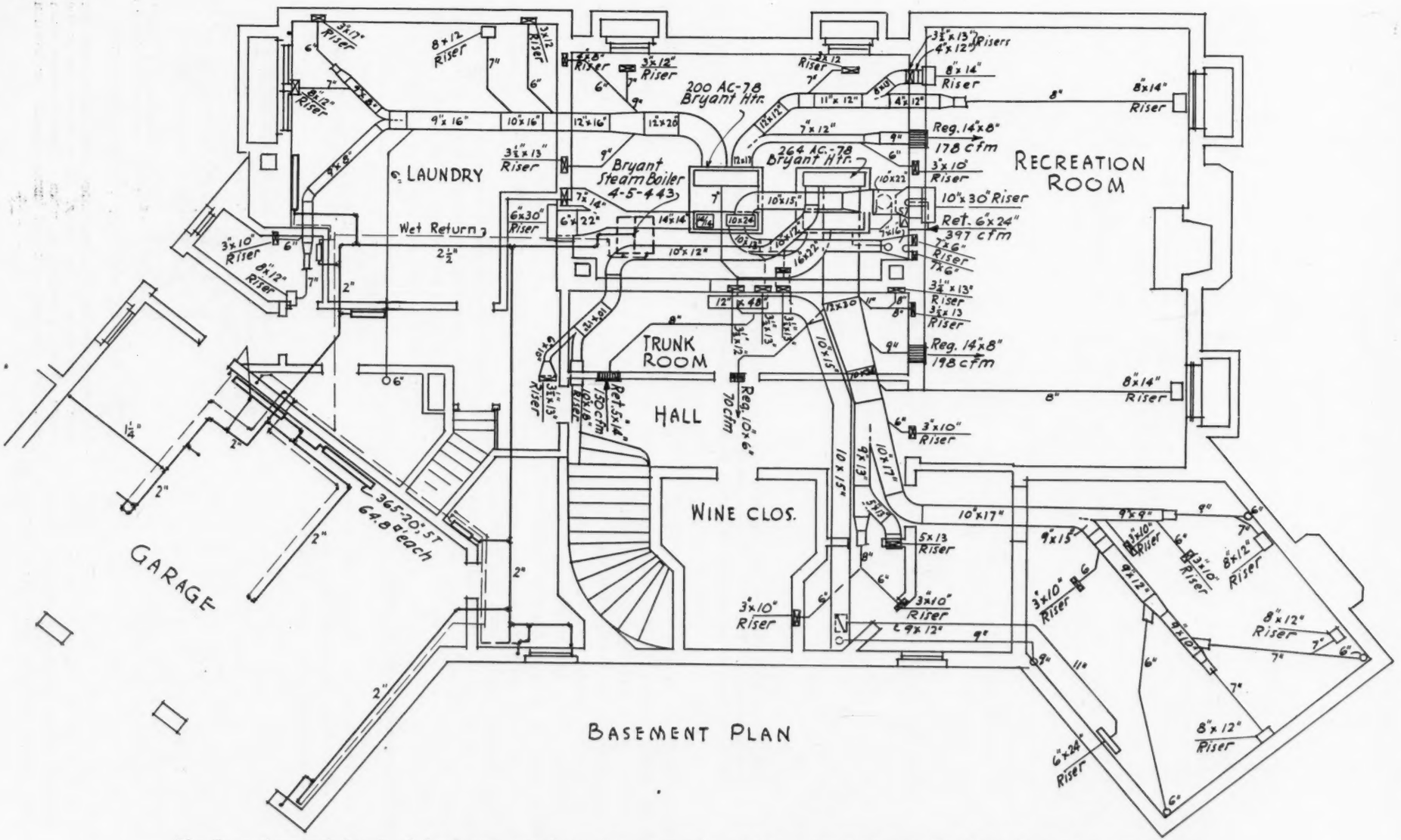
L. A. Brissette, Treasurer of the Trask company, has an interesting theory for this trend. According to Mr. Brissette, older generations of wealthy New Englanders have always been accustomed to plenty of heat—the hotels, resorts, public places frequented by them always provided plenty of heat, but little air conditioning. Younger generations, however, have accepted air conditioning because their haunts are all conditioned, but some reluctance is manifested when air conditioning is suggested for an entire house and, while they like conditioned air for themselves, their memories make straight heating seem quite all right for service quarters. To meet this situation the type of installation described here has been found acceptable.

Features of the Plan

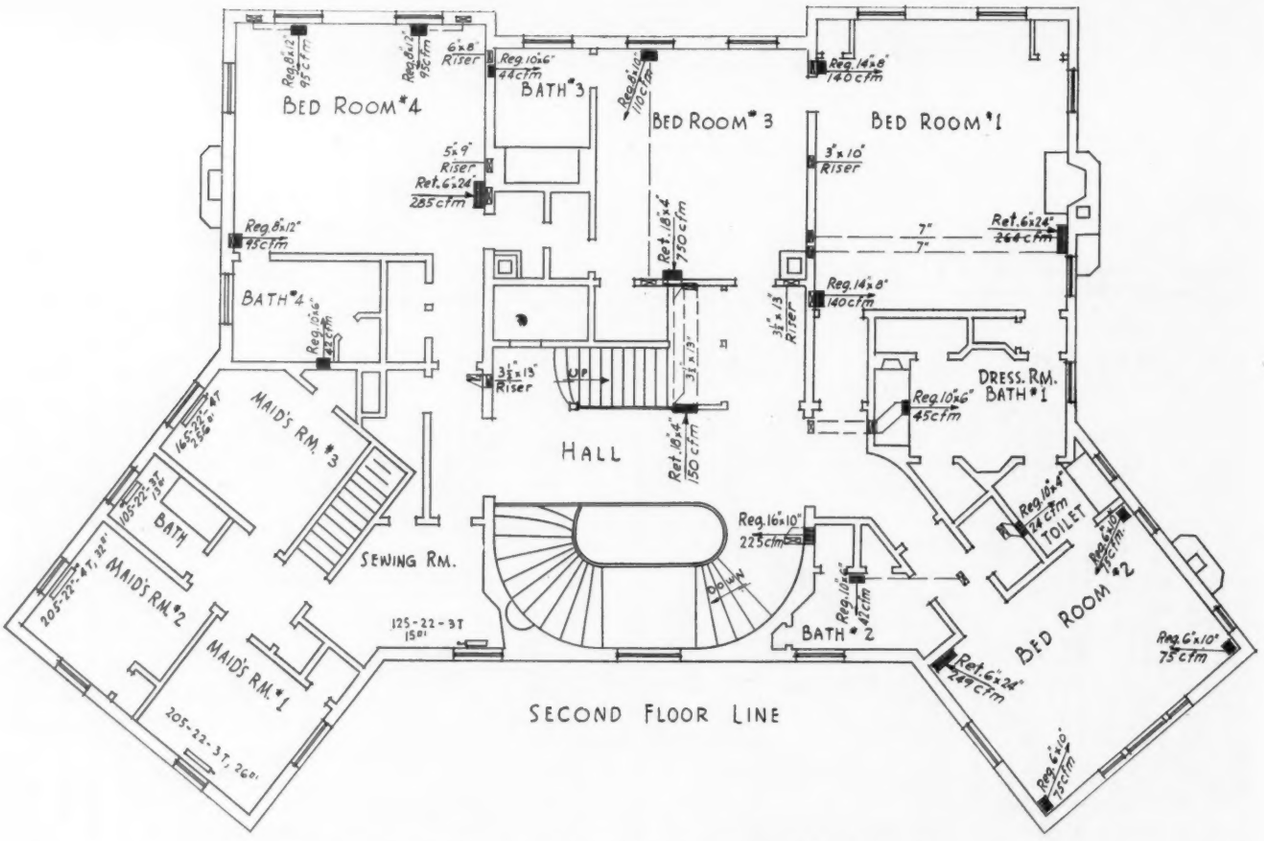
A study of the plans shows a number of interesting features. The house is heated in three zones. Two of the zones are supplied by direct-fired, gas furnaces (compete with blower, filters, humidifier); the third zone is heated by radiators supplied from a separate gas-fired boiler. Each furnace supplies conditioned air to first, second and third floors (not shown), thus zoning the house front and rear (north and south) rather than by occupancy. Each zone is controlled by a thermostat on the first floor as shown on the plan.

The distribution system is of interest in that rectangular mains are run out from the furnaces as





The floor plans and details of this Boston installation have a number of interesting features. Probably of most interest is the use of floor registers, located on outside walls under windows or in exposed corners. Note how many of these are used in this house and where registers are placed. Second, returns are also floor faces on inside walls placed, where possible, at the point where cold air pressure is assumed to be greatest. Third, the use of extended plenums with round pipe branches tapped off all along the runs eliminates many costly fittings, makes installation easy and reduces cost. Careful study of the plans shows strict attention to owner comfort before price.



The second floor plan and the first floor plan (page 48) show how the building is zoned vertically. The basement plan shows the air flow for this type of zoning. Note the number of registers in critical rooms, a feature of Trask engineering.

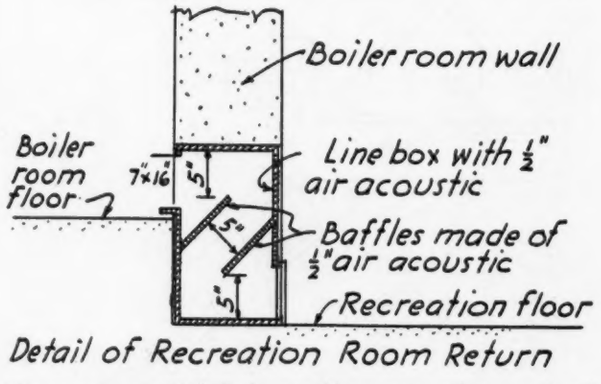
extended plenums with round pipe branches taken off all along the mains. Where possible these round pipe branches are run between joists, but even where this is not possible the small pipes used are less obstructive to head room than large rectangular pipes. Further, many branches are run and the floor plans show the large number of registers used in major rooms. The purpose of this method is to reduce cost, eliminate many small and troublesome rectangular fittings, make installation easy and put air into rooms through several registers around the room.

Trask Recommends Floor Registers

The use of floor registers may interest mid-western contractors who, for several years, have adopted high side wall or baseboard registers. The Trask company, however, has used floor registers for many years and, all other theories of the industry to the contrary, have scores of installations to prove that floor registers, righty handled, will provide highly satisfactory room conditions. The success of floor registers, according to the Trask company, is due to their unorthodox placement of the floor registers along outside walls, in outside corners; also due to their use of several registers in all major rooms (one register in each outside corner or on each outside wall under windows where possible) and, lastly, due to the use of low register air velocities (350 fpm) which permits the warm air to "float" up from the register warming cold infiltering air on its way to the ceiling and from outside corners "float" across the ceiling toward the center of the room and toward inside walls. A study of the plans will show how many windows or outside corners are thus blanketed by warm air.

Returns on Inside Walls

In connection with warm air registers, the return system warrants study. Return air faces in every major room are part of the Trask plan. Further, these return air faces are placed in the floor along



The owner specified that recreation room noises must not enter other parts of the house. This sound trap at the return effectively stopped all noise at the recreation room wall. See basement plan and furnace details for location of box.

This installation violates several of our present day ideas. However, Trask has scores of these jobs to prove that floor registers in outside walls; returns on inside walls, round pipe branches from extended plenums; plus plenty of registers, thoroughly satisfy critical owners.

inside walls and, where possible, the return air face forms the apex of the warm air register triangle with the cold air return placed where one would expect the infiltrating air to concentrate due to pressure from windows. The return branch and mains are full round or rectangular pipe—lined joist spaces are not favored in Trask engineering because Trask wants equalized pressure throughout the return and piping which can be as carefully balanced as the supply side of the system.

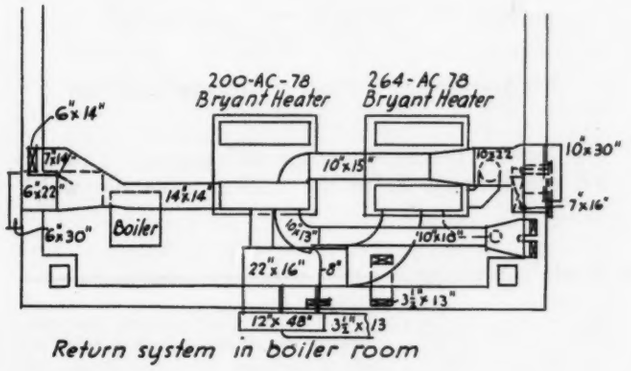
In this particular house some of the paths by which air is sent to registers or brought back from grilles are unusual. The book room, for example, has round pipe risers in all four corners (behind paneling); air from bed room No. 1 crosses under the floor through two 7-inch round pipes; air to bed room No. 3 comes from a stack on the inside wall, thus crossing under the floor in one 7-inch pipe; registers offset from stacks are frequent.

Furnace Details

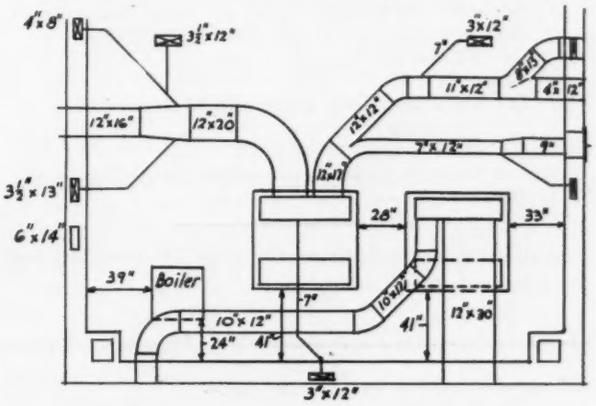
One group of four details shows the plans and elevations of the two furnaces and the runs of rectangular pipe to and from the plenums. All plenums are built straight up as high as the ceiling will permit, another Trask detail, and mains are tapped straight out from the plenums. The Trask company believes that this gives maximum mixing turbulence, minimum temperature differentiation around the plenum and considerably simplifies metal work. One of the gas furnaces has an output at the bonnet of 160,000 Btu at 2,000 cfm; the larger furnace has a bonnet output of 211,200 Btu at 2,600 cfm. The calculated heat loss of the air conditioned portion of the house is 298,600 Btu per hour; the heat loss of the area served by radiation is 119,200 Btu per hour. Gas used for heating the house is obtained at a cost of 50 cents per 1,000 cu. ft.

Sound Trap for Recreation Room

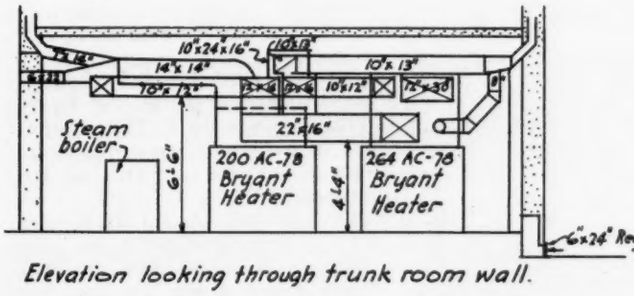
A detail of some interest is the return face used in the basement recreation room. The owner wanted noise in the recreation room confined to the recreation room and blocked out of the distributing system (see elevation of furnaces). To insure quietness, the Trask company designed the box shown; lined the box with acoustical material and inserted the two baffles on angle framing. Noise which might otherwise get into the distributing system is thereby stopped at the recreation room wall.



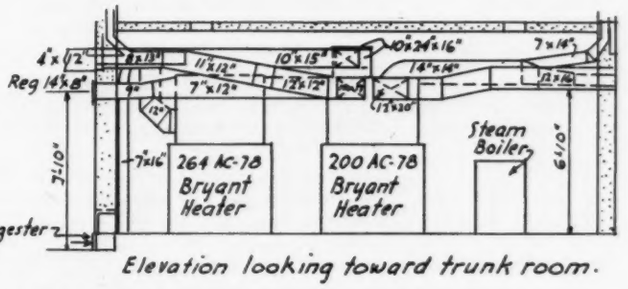
Return system in boiler room



Warm air system in boiler room



Elevation looking through trunk room wall.



Elevation looking toward trunk room.

Plans and elevations of the two furnaces separated into supply and return systems for easy study. The high plenums with straight take-offs are recommended by Trask. Compare with basement plan for runs of pipe outside the furnace room.

Building Insulation; Types and Applications

Paper delivered by S. Konzo at the Second Air Conditioning Conference, University of Illinois, Urbana, Illinois, March 8 and 9, 1939.

SHELTER, whether it be a tent or a bungalow, consists of a barrier between the occupant and the external weather. Naturally the effectiveness of that barrier is directly dependent upon the nature of the construction of the shelter itself. Good construction of the shelter, in the shape of walls and ceilings forming adequate heat and wind barriers, consists of insulation of walls and ceiling, tight walls, double windows, weatherstripping of doors and windows, calking of window frames, and awnings for summer use. In this paper a brief outline will be presented of types of insulation, effectiveness of different thicknesses of insulation as related to its use in forming an adequate heat barrier or in reducing heat transmission, and the increase in comfort conditions resulting from the use of insulation.

Types of Insulation

Insulating materials of many diverse types and forms are commercially available, as indicated in Table 1 and Fig. 1.

TABLE 1

TYPES OF INSULATION

(1) Loose Fill or Blanket (blown or packed into spaces)
  (a) Vegetable source, such as granulated cork
  (b) Mineral source, such as wools
(2) Boards
  (a) Rigid type (some forms used in place of wood sheathing)
  (b) Flexible type
  (c) Slab type (some forms used as plaster base)
(3) Reflective Types

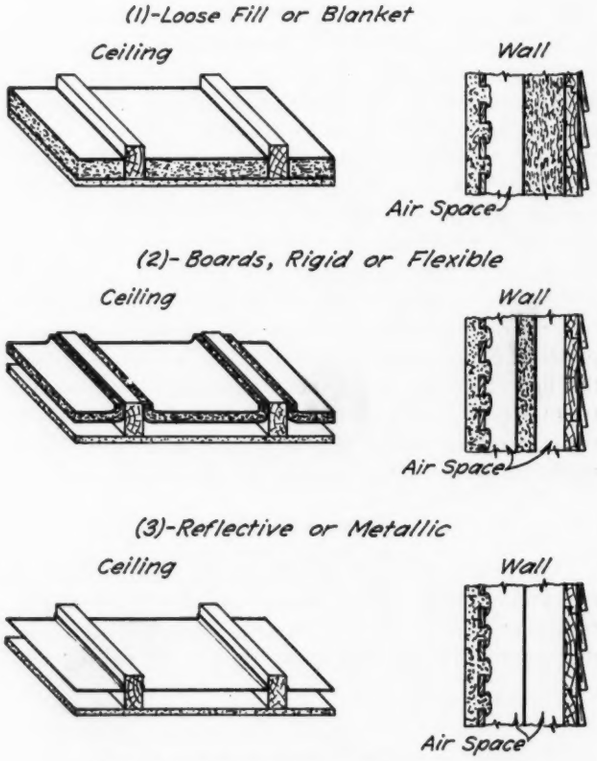


Fig. 1—Common Methods of Applying Insulation

With few exceptions in the case of loose fill and the board types of insulation as shown in Table 2, the conductivity, k, of the various materials which

Appendix—Equations of Heat Transmission

(a) Notation Used in Equations in Text.—

C, C_p, C_a, C_s = Conductance, or B.t.u. transmitted per hr. per sq. ft. per deg. F. difference in temperature from surface to surface for the *thickness as stated.* The subscripts p, a, and s refer respectively to plaster, air space, and sheathing.

k = Conductivity, or B.t.u. transmitted per hr. per sq. ft. per deg. F. difference in temperature from surface to surface per *inch of thickness.*

x = Thickness of material in inches. In the equations given in Appendix Sections (b), (d), and (e) the x refers to the thickness of the applied insulation.

$A, A_w, A_c; A_r$ = Area of surface in sq. ft. The subscripts w, c, and r refer respectively to wall, ceiling, and roof.

$U, U_w, U_c, U_r, U_{com}$ = Overall coefficient of heat transmission or B.t.u. transmitted per hr. per sq. ft. per deg. F. difference in temperature from *air to air.* The subscripts w, c, r, and com refer to wall, ceiling, roof and combined ceiling-roof respectively.

H, H_w, H_c = Heat transmitted through structure or material in Bt.u. per hr. per deg. F.

t, t_i, t_o, t_a, t_s = Temperature in deg. F. The subscripts i, o, a, and s refer respectively to indoor air, outdoor air, attic air and surface.

f_i, f_o = Film coefficients of heat transmission or B.t.u. transmitted per hr. per sq. ft. per deg. F. temperature difference from *surface to air.* The subscripts i and o refer to inner film (exposed to room air) and outer film (exposed to outdoor air).

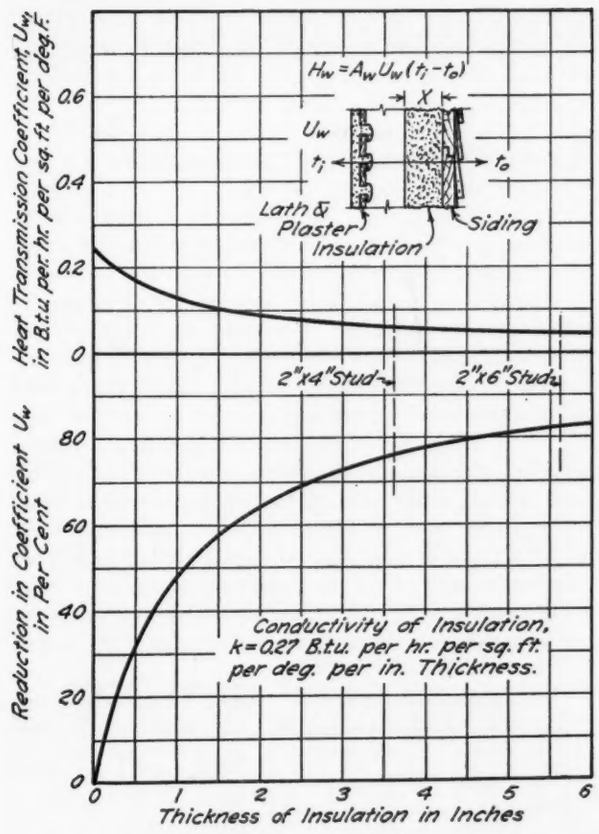


Fig. 2—Insulation Applied to Typical Wall

are commercially available ranges in value from about 0.24 to 0.30, or an average value of 0.27 B.t.u. per hr. per sq. ft. per deg. F. in temperature from surface to surface per inch of thickness. In fact, any calculations of overall heat transmission coefficients based on a conductivity value of 0.27 will represent fairly well the results which may be expected from a large majority of the loose fill and board types of insulation. Hence, the calculations presented in this paper are based on this average conductivity of 0.27 B.t.u. per hr. per sq. ft. per deg. F. per inch of thickness. Exact values of conductivity for various types of insulating material are given in the A.S.H.V.E. Guide.

Conductivity values, k, which are based on a thickness of insulation of *1 in.*, do not serve as a reliable criterion in comparing the effectiveness of two types of insulation of different thicknesses. The conductance of the material, C, namely the heat transmitted through the *actual* thickness of the material, offers a more significant value in comparing the relative effectiveness of two types of insulations. If the conductivity, k, is given

TABLE 2

CONDUCTIVITIES (k) OF INSULATING MATERIALS
Values reproduced from A.S.H.V.E. Guide[3] of 1938
See also Appendix Sections (a) and (b)

	k
Blanket or Flexible Type	
Fiber—Typical	0.27
(Ranges from 0.24 to 0.28 for wood fiber, eel grass, flax fiber, hair, and jute.)	
Semi-Rigid	
Fiber—Ranges from 0.25 to 0.32 for flax, hair, jute, and peat moss.	
Loose Fill or Bat Type	
Fiber—Fibrous material from dolomite and silica	0.27
Fibrous material from slag	0.27
Glass Wool—Fibrous material	0.27
Mineral Wool—All forms, typical	0.27
Rock Wool—Fibrous material made from rock, 10-lb. per cu. ft.	0.27
Regranulated cork, 3/16-in. particles	0.31
Sawdust	0.41
Gypsum—flaked, dry, fluffy, 24-lb. per cu. ft.	0.48
Rigid Type	
Corkboard—Typical	0.30
Fiber—Typical	0.33
(Range from 0.29 to 0.36 for fibers from wood, cane, straw, and corn stalks.)	

for any material, the conductance, C, for a thickness x in. may be determined from the equation:

$$C = k/x \qquad (1)$$

Since the insulation in a wall or ceiling is superimposed on the structural frame comprising the wall or ceiling, the actual reduction in the heat loss effected by adding insulation can be determined only from the overall coefficient of heat transmission, U, for the entire wall or ceiling (for formula see Appendix Section (c)). For the purposes of this discussion the arbitrary classification of heat barriers shown in Table 3 has been made.

TABLE 3

ARBITRARY CLASSIFICATION OF HEAT BARRIERS

Classification	U Overall coefficient of heat transmission, B.t.u. per hr. per sq. ft. per deg. F.
Excellent heat barrier	0.1 B.t.u. or less
Good heat barrier	From 0.1 to 0.20 B.t.u.
Fair heat barrier	From 0.2 to 0.30 B.t.u.
Poor heat barrier	Over 0.30 B.t.u.

Insulation of Walls

The effect of insulation in reducing the overall coefficient of heat transmission from outdoor air to indoor air can be determined only when the construction of the wall or ceiling is specified. The effectiveness of a given thickness and type of insulation will be greater when the insulation is applied to a relatively poorer wall or ceiling.

The values shown in the top part of Fig. 2 show the decrease in the overall coefficient of heat transmission for different thicknesses of insulation installed in a standard frame wall, having an original coefficient, U, of 0.25 B.t.u. per hr. per sq. ft. per deg. F. between air to air (see Appendix Section (d)). The percentage

Appendix—Equations of Heat Transmission

(b) Relation between Conductance and Conductivity.—

The conductance is equal to the conductivity divided by the thickness, or

$$C = \frac{k}{x}$$

(c) Determination of Overall Coefficient of Heat Transmission, U.—

$$U = \frac{1}{\frac{1}{f_i} + \frac{x_1}{k_1} + \frac{x_2}{k_2} + \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{f_o}}$$

(d) Insulation Applied to Typical Wall.—

A typical wall was considered as having a coefficient of heat transmission of 0.245 B.t.u. per hr. per sq. ft. per deg. F.

$$U_w = \frac{1}{\frac{1}{f_i} + \frac{1}{C_p} + \frac{1}{C_a} + \frac{x}{k} + \frac{1}{C_s} + \frac{1}{f_o}}$$

$$= \frac{1}{\frac{1}{1.65} + \frac{1}{2.5} + \frac{1}{1.1} + \frac{x}{0.27} + \frac{1}{0.5} + \frac{1}{6.0}} = \frac{1}{4.09 + \frac{x}{0.27}}$$

reduction in the overall coefficient is shown in the lower part of Fig. 2. The reduction in the overall coefficient is 48, 64, and 73 per cent for insulation thicknesses of 1, 2, and 3 in. The diminishing return from each additional inch of applied insulation is clearly illustrated by the fact that with the first inch of insulation the reduction was 48 per cent, whereas for the next inch the reduction was 16 per cent, and for the third inch it was 9 per cent.

From the standpoint of the most economical thickness of insulation, taking into consideration the cost of fuel, the cost of insulation, the severity of the climate, and the maximum return on the investment, the use of a thickness greater than 1 in. might be difficult to

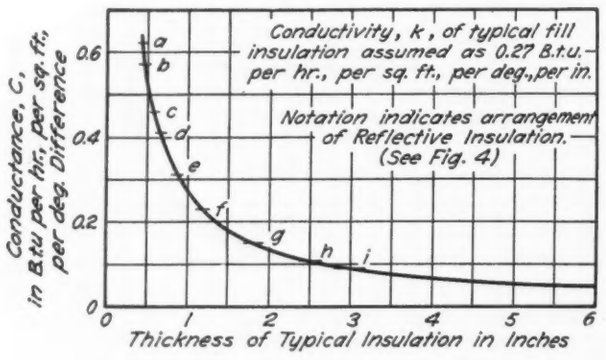

Conductivity, k, of typical fill insulation assumed as 0.27 B.t.u. per hr., per sq. ft., per deg., per in.
Notation indicates arrangement of Reflective Insulation. (See Fig. 4)
Conductance, C, in B.t.u. per hr., per sq. ft., per deg. Difference
Thickness of Typical Insulation in Inches
0.6
0.4
0.2
0
0 1 2 3 4 5 6
a b c d e f g h i

Fig. 3—Conductance of Typical Insulation

justify. However, other considerations such as the possible reduction in size of heating plant and the increase in comfort resulting from the use of adequate amounts of insulation lead to the conclusion that the additional investment represented by at least *two* inches of insulation may be justified. From Fig. 2 it is apparent that the use of 2 in. of insulation in a typical wall will result in a value less than 0.1 B.t.u. per hr. per sq. ft. per deg. for the overall coefficient of heat transmission, thus making the wall conform with the best classification shown in Table 3.

Reflective or Metallic Insulation

The reflective, or metallic, forms of insulation are comparatively new on the market, and are usually inserted in the studding space so that the sheets are separated by air spaces. Unlike any of the filler or board types of insulating material, the effectiveness of the reflective types of insulation is not proportional to the thickness of the metallic sheet itself. The insulating value is dependent on the ability of the metallic surface to reflect radiation received upon it. That is, materials having a low emissivity coefficient are better insulators than materials which absorb a large percentage of the heat received upon the surface. The insulating value is also dependent on the number of layers or curtains of reflective insulation used in any given wall or ceiling construction.

The insulating value of aluminum foil and similar reflective types of insulation can be expressed in terms of the equivalent thickness of some common form of insulating material, which would be required to produce the same insulating effect. As a basis of comparison a typical insulation was selected having a heat conductivity of 0.27 B.t.u. per hr. per sq. ft. per deg. per in. thickness of material. A graph showing the heat conductance of this typical insulation for various thicknesses of the material is shown in Fig. 3. The value for heat conductance decreases quite rapidly as the thickness of insulation is increased. This is especially true for thicknesses up to 2 in.

The notation (*a, b, c,* etc.) in Fig. 3 indicates the values of heat conductance for various arrangements of the reflective type of insulation, which are shown in the diagram on the left-hand side of Fig. 4. For example, arrangement "*a*" consisting of one layer of reflective foil, placed on one surface spaced ⅜ in. from another surface, thus forming an air space, has a heat conductance equal to 0.62 B.t.u. per sq. ft. per deg. difference. It may be noted from Fig. 4 that arrangement "*a*" is equivalent in heat conductance to 0.44 in. of fill insulation placed in contact against a wall surface.

The conductance values for the nine arrangements of the reflecting foil insulation are those determined from tests conducted by Prof. F. B. Rowley at the University of Minnesota. These conductance values were in every case superimposed on the curve shown in Fig. 3, and

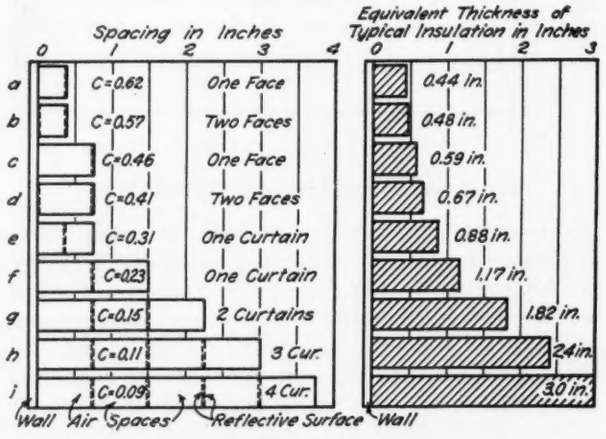

Spacing in Inches
0 1 2 3 4
Equivalent Thickness of Typical Insulation in Inches
0 1 2 3
a C=0.62 One Face 0.44 in.
b C=0.57 Two Faces 0.48 in.
c C=0.46 One Face 0.59 in.
d C=0.41 Two Faces 0.67 in.
e C=0.31 One Curtain 0.88 in.
f C=0.23 One Curtain 1.17 in.
g C=0.15 2 Curtains 1.82 in.
h C=0.11 3 Cur. 2.4 in.
i C=0.09 4 Cur. 3.0 in.
Wall Air Spaces Reflective Surface Wall

Fig. 4—Equivalent Thickness of Reflective Insulation

a value of equivalent thickness of typical insulation was thereby determined. The values of equivalent thickness are shown in graphical form on the right side of Fig. 4.

An inspection of the values tabulated in Fig. 4 indicates some interesting relationships, as follows:

(1) The value for heat conductance for reflective insulation decreases when the width of the air space between the foil insulation and the surface is increased from ⅜ in. to ¾ in. Compare arrangement "*a*" with "*c*"; also arrangement "*b*" with "*d*".

(2) The insulating effect of a curtain, composed of two bright reflective surfaces, is better than that of an air space faced with reflective surfaces. Compare arrangement "*e*" with "*b*"; also arrangement "*f*" with "*d*".

(3) An increase in the number of curtains of foil insulation increases the number of air spaces and reflective surfaces, thereby decreasing the conductance. Compare arrangement "*f*" with "*g*".

(4) Two curtains of aluminum foil placed in a space 2¼ in. wide give an insulating effect equivalent to 1.8 in. of fill insulation.

In general the insulating effect obtained from other

(*Continued on page* 102)

A Suggested Method of Establishing Temperatures in Unheated Spaces

By C. C. Carsen

One of the "hard-to-believe" formulas used in the Technical Code has been formula 4, with Table 1, which gives temperatures in unheated attics at various outside temperatures and with different kinds of attic floors. Contractors frequently express objection to some of the attic temperatures shown in Table 1. The author suggests a different formula which can be used for attics or adjoining, unheated spaces. Your comments are invited.

THERE has long been a question as to the methods commonly used to estimate the heating load for rooms below unheated attics where the ceiling and the roof must be figured as one coefficient of heat loss. Frequently it is desirable to establish the coefficient as a function of the ceiling area rather than the roof area.

Quite often I have had to estimate the heat loss in factory spaces where portions of the building are heated while adjacent rooms or areas separated by a partition are not heated or where these other areas have certain heat outputs from processes. It is helpful to have some means of determining, as accurately as present heat transfer data will permit, the exact temperature that may be expected in these various rooms. The method following has been used many times on such jobs.

Let us assume that we are to heat the room shown under the attic to these specifications:

Inside temperature — 70 deg.
Outdoor temperature — minus 5 deg.
Attic roof— U = .46. Area 300 sq. ft.
Attic ends — U = .25. Area 90 sq. ft.
Attic windows — U = 1.13. Area 20 sq. ft.
Attic infiltration = 500 CFH.
Ceiling — U = .62. Area 200 sq. ft.

Let H_1 equal the heat gain in attic space from heated room. Then, H_1 equals:

$200 \times .62 \times (70\text{-}T) = 8680 - 124T$

Let H_2 equal the heat loss from the attic space to the out of doors.

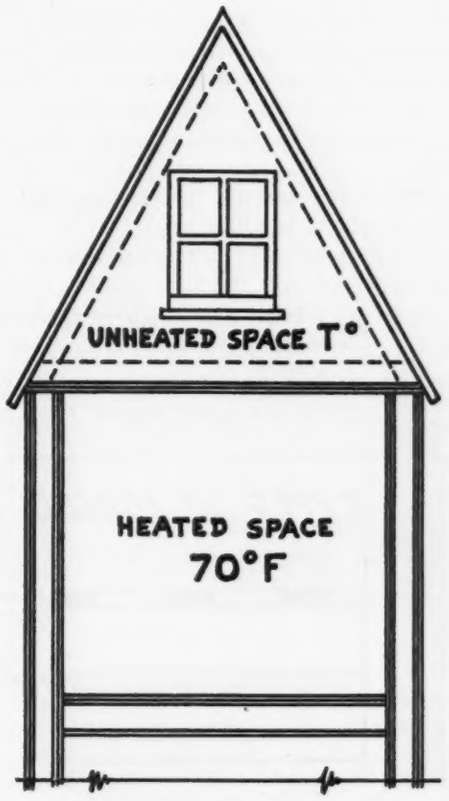
Then H_2 will equal:

$[300 \times .46 \times (T + 5)] + [90 \times .25 \times (T + 5)] + [20 \times 1.13 \times (T + 5)] + [500 \times .018 \times (T + 5)]$

equals:

$192.1T + 960.5$

Under design conditions temperature "T" will remain a constant and H_1 will equal H_2. Therefore:



$8680 - 124T = 192.1T + 960.5$
$316.1T = 7719.5$
$T = 24.4$ deg. F.

Therefore the design load for any room would include (area of ceiling) $\times .62 \times (70 - 24.4)$ Btu per hour.

A like procedure will determine the temperature in any unheated or partially heated space divided by partitions and the same procedure is equally applicable in estimating the summer cooling load with reversed heat transfer.

Air Conditioning Facts From the Research Residence

Automatic Controls for Forced Air Heating Systems

By S. Konzo

Special Research Assistant Professor
Engineering Experiment Station
University of Illinois

AN extensive series of tests have been conducted in the Warm Air Heating Research Residence of the National Warm Air Heating and Air Conditioning Association dealing with various types of automatic control systems. Detailed reports of these investigations have been presented in Univ. of Illinois Eng. Exp. Sta. Bul. 266, in numerous technical papers and in the book entitled "Winter Air Conditioning—Forced Air Heating." In this and in the succeeding article a brief discussion will be presented of some of the essential features of automatic control systems and some of the limitations accompanying the use of each type of control system.

In general the various types of control systems may be classified as follows:

A. Continuous fan operation. (See Fig. 1, Type I)
   1. Modulated bonnet air temperature with constant air delivery
   2. Modulated air delivery with constant bonnet air temperature

B. Intermittent fan operation.
   1. Automatic control of both the fan operation and the burner operation; so that the fan operated intermittently, and the burner on-periods occurred irrespective of whether or not the fan was running. (See Fig. 1, Type II)
   2. Automatic control of both the fan operation and burner operation; so that the fan operated intermittently, except during the burner on-periods when it was rendered totally inoperative. (See Fig. 1, Type III)
   3. Automatic control of both the fan operation and the burner operation; so that the fan operated intermittently, and the burner on-periods accompanied either all, or some fraction of each of the fan on-periods. (See Fig. 1, Type IV)

C. Two Speed Fan Operation.
   Low speed intermittent operation of the fan during periods of little heat demand

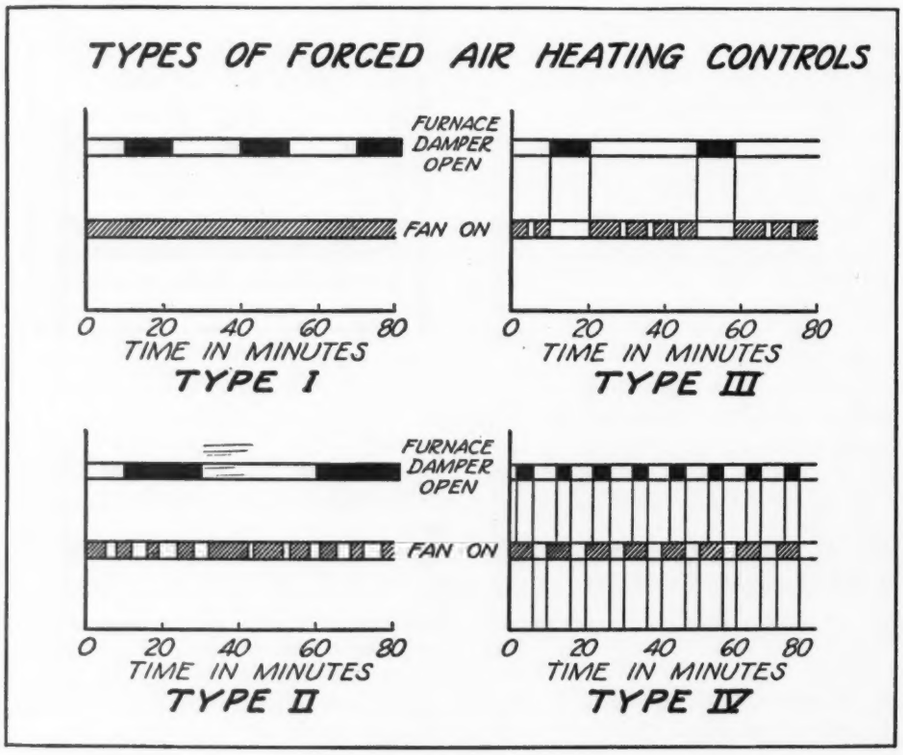


Fig. 1—Four general types of controls for forced air heating systems charted for damper opening - fan operating sequence. (From Winter Air Conditioning, Forced Warm Air Heating, by S. Konzo.)

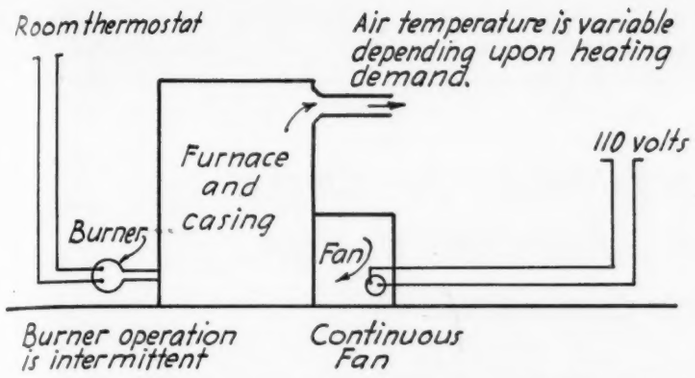


Fig. 2—Line diagram of control system providing for continuous fan operation with constant air delivery and VARIABLE bonnet air temperatures.

merging into combined low speed and high speed operation of the fan during periods of large heat demand.

The most commonly used control systems are those which provide for intermittent operation of the fan and burner, particularly those designated as types II and IV in Fig. 1. Control systems, which provide for continuous operation of the fan alone are not commonly used for ordinary residential heating plants. However, the increasing application of forced air heating systems to large buildings has resulted in a renewed interest in this method of control.

A. Continuous fan operation (See Fig. 1, Type I)

1. Modulated bonnet air temperature with constant air delivery.

A simplified diagram of this control system is shown in Fig. 2. The operation of the burner either gas, oil, or coal fired, is controlled from the room thermostat. The advantages, limitations and requirements of this method of control may be enumerated as follows:

Advantages

a—Simplicity of the control mechanism and operation.

b—Positive and continuous circulation of air.

c—Least tendency for stratification of air, in room, Continuous circulation of air results in more uniform air temperatures in all rooms and in all parts of the room.

d—Maximum efficiency of heat transmission from heated surfaces of the furnace.

e—No tendency towards overheating of furnace or bonnet.

Limitations

a—Continuous operation of fan at high speed requires large electrical input to fan motor. In the case of churches and similar structures in which the heating plant is used relatively infrequently this item may not be significant.

b—The response of the furnace to any heating demand will depend upon the method of firing used. Since the bonnet air temperatures will be low at all times an appreciable period of time may elapse after the room thermostat demands heat before the room temperatures increase.

Requirements

a—The delivery of low temperature air from the registers may create drafts. The use either of high sidewall registers or a low limit bonnet thermostat will minimize such tendencies.

b—Since the response of the furnace to heating demands is somewhat delayed, the room temperatures may decrease to a value less than the lower limit of the room thermostat. Hence it may be advisable to set the room thermostat high enough so that at no time will the room temperatures become so low as to cause discomfort.

c—A high limit bonnet thermostat may be used to stop the burner when the bonnet air temperature becomes excessively high. This safety feature is particularly desirable in the case of hand-fired, coal burning furnaces.

d—Since the high speed fan is operated continuously it is desirable to reduce the duct resistance as much as possible in order to minmize the electrical costs. The design of the duct system should be based on the minimum practical resistance.

A.—Continuous fan operation. (See Fig. 1, Type I)

2. Modulated air delivery with constant bonnet air temperature.

A simplified diagram of this arrangement is shown in Fig. 3. A separate duct (a) from the fan outlet to the furnace bonnet permits a portion of the unheated air to by-pass the furnace and to mix with the heated air passing through the path (b). Two pairs of adjustable dampers, (c) and (d), both controlled from a single duct thermostat, (e), can be regulated so that the unheated and heated air are mixed in the proper proportions to maintain a uniform bonnet air temperature. The burner is operated directly from the room thermostat, (f), and a high limit bonnet thermostat, (g), serves to stop the burner when the bonnet air temperature reaches a predetermined value.

If the duct thermostat, (e), is set at 135 deg. F., for example, then for all temperatures of the heated air, (b), less than 135 deg. F. the damper (d) should be wide open and the damper (c) should be entirely closed.

(*Continued on page* 104)

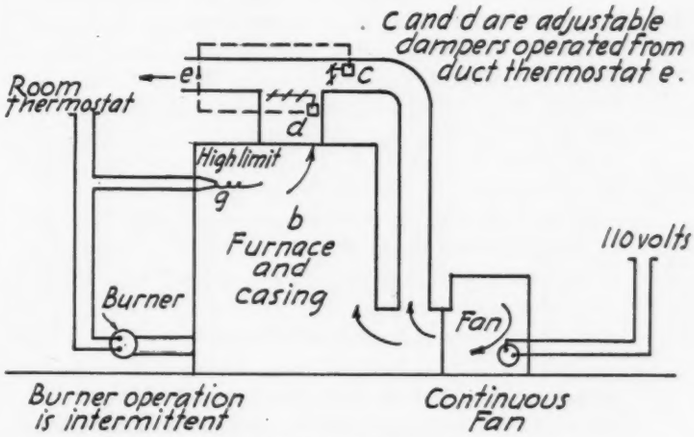


Fig. 3—Line diagram of control system providing for continuous fan operation with constant air delivery and CONSTANT bonnet air temperatures.

Pointers on Oil Burner Installation*

with particular reference to draft control, combustion chamber design, and service problems

By Eugene Olson

THREE common problems constantly confront the installer of oil burning equipment:

1. Proper combustion chamber design,
2. Draft control, and
3. Service problems.

All installers of oil burning equipment should study and follow their respective installation and service manuals; that, however, has its limitations. In the first place, many companies do not publish such a manual. In the second place, every installation has its own peculiar problems that cannot be covered by a manual. Furthermore, we would all rather use our heads than do something because it "says so in the book."

In order to eliminate any misconceptions and to get a better understanding of oil burning, let us approach the problems on the basis of the four fundamental laws governing the efficient burning of oil:

Law No. 1. The oil must be completely "atomized."

Law No. 2. The oil must be mixed with the proper amount of air.

Law No. 3. The products of combustion must be maintained above ignition temperature until completely burned.

Law No. 4. The oil must be burned in suspension.

And a fifth law based on experience: (not generally mentioned, yet very important):

Law No. 5. There must be sufficient total furnace volume to accommodate the products of combustion.

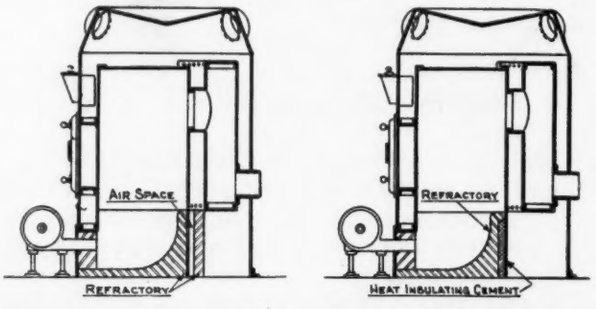
In conversion jobs, this volume must be at least 5 to 6 cubic feet per gallon of oil burned per hour. Anything less than that usually leads to trouble in the form of back pressure, gas and odor leakage, carboning of nozzles and electrodes, and high fuel bills. In order to be of value this volume must be in the direction of gas travel. Sometimes it may be necessary to raise the boiler or pit the combustion chamber in order to get sufficient volume.

Any good oil burner accomplishes basic law No. 1. The fulfillment of the other three basic laws calls for a properly constructed combustion chamber.

Law No. 2 requires that the "atomized oil and the air be not only placed in intimate contact momentarily, but also held in contact until combustion is complete. A combustion chamber, of refractory material, shaped to conform to the shape of the flame of the particular burner in question accomplishes this most efficiently. Some burners give a long, narrow flame, others a short, wide flame. The same shape of combustion chamber would not serve both types.

In some installations, mostly industrial, it is necessary to introduce secondary air. This is sometimes done by an opening in the front of the combustion chamber just below the burner. The better method, according to most authorities (also the most difficult) is to bring the air in through a series of holes in the floor of the combustion chamber. This preheats the air, besides assuring better mixing with the oil.

Some idea of what is meant by the "proper amount of air" may be of interest: Combustion of 1 pound of No. 3 oil requires the oxygen from approximately 14.2 pounds of air. In terms of volume, 1 gallon of oil requires approximately 1,370 cu. ft. of air, with no excess. With the common setting of 50% excess air, one gallon of oil requires approximately 2,050 cu. ft. of air. It is readily seen that in many cases some means of air intake into the furnace room must be provided. This is especially true on jobs where the oil rate exceeds 2 or 3 gallons per hour.



Two recommended types of combustion chambers for warm air furnaces with gun type burner. Drawings from "Handbook of Oil Burning."

A combustion chamber shaped to fit the flame gives the uniform reflected heat in the combustion zone that is necessary to fulfill law No. 3. A refractory that becomes red hot quickly is best from this standpoint.

A properly shaped combustion chamber prevents flame impingement, thus fulfilling law No. 4.

In addition to providing good combustion, a cham-

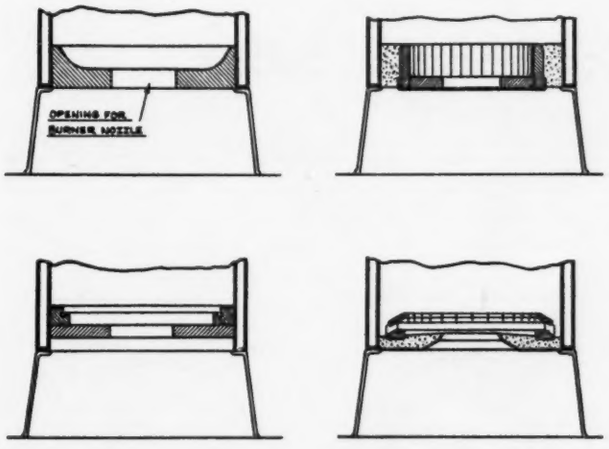
*Papers presented at 1937 and 1938 Iowa Heating and Air Conditioning conference, Iowa State College, Ames.

ber built as described above produces the quietest possible flame.

The combustion chamber has another purpose besides aiding combustion. It can be made to direct the heat travel in the boiler or furnace. That includes directing the heat where needed and protecting the parts where heat is not desired.

To accomplish the former, a corbel on the back wall of the chamber to throw the heat to the front of a boiler or to the dome of a warm air furnace prevents too rapid exit of the hot gases. The result is lower stack temperatures and hence, fuel savings. The installer must be careful, however, in using this construction. There are many boilers where it would be definitely harmful. Each job requires different treatment.

It is advisable to insulate the sides and bottom of the combustion chamber thoroughly, with a good insulating material, such as rock wool or some form of expanded mica, or dry asbestos. If the walls are of the proper height, this will protect the lower part of the furnace, and in the case of warm air, or hot water systems, prevent reversal of circulation. That frequently occurs if the returns are allowed to become hot. Insulation of the bottom prevents heat loss to the concrete floor and the damp earth under it. In several cases that I have seen it would have prevented actual dam-



Suggested hearths for various types of rotary burners. From "Handbook of Oil Burning."

age to the boiler that was caused by a steam pocket under the floor.

As to size, most manufacturers agree that about 100 sq. in. of combustion chamber floor area per gal. of oil per hour is adequate. A slightly oversize chamber, say up to 120 sq. in., gives good results if it is shaped as mentioned above. As stated before, the side walls should be high enough to clear the boiler returns, and in no case should they be less than 15 in. high. Some manufacturers use 18 in. walls with good results.

Draft, as concerns a furnace, is the difference in pressure inside and outside the chimney and the system connected to it. This difference in pressure is caused by a difference in temperature. With the advent of high efficiency heating equipment, the draft problem becomes more acute. The common causes of low and fluctuating draft are:

1. Low chimneys—usually on new bungalows.
2. Soot and mortar lodged in bends.
3. Long, horizontal smoke pipes with insufficient pitch.
4. Smoke pipe too small.
5. Dampers left in the pipe that customers can adjust.
6. Cracked chimneys.
7. Trees or tall buildings nearby.

There may be others.

Strong draft must be controlled with a good automatic draft regulator. Most factories recommend a draft *in the furnace* of .02 in. to .04 in. of water.

Frequently asked is—"how to eliminate tank hum, with inside tanks." There are various ways:

1. Install an air cushion, made with a tee and a capped ½ in. pipe nipple about 8 in. long, next to the tank valve.
2. There are various anti-hum valves, spring checks (adjustable), and constant level valves that give good results. There is no one cure for all jobs.

A few general suggestions, based on field observations:

Always install a limit control with the burner. It is neither safe nor satisfactory to leave it off.

The dealer who boasts of not having been back to a job for three years or so is inviting trouble. It has been found profitable to both dealer and customer to make periodic inspections, at least once a year and preferably twice.

What Is an "Average" Job?

To answer the question: what constitutes average oil burner performance in the field, the following summary:

Out of approximately 400 oil burner installations, mostly domestic, which I have tested during the heating season of 1937-38, I selected at random 200 tests from about 70 towns and cities in Iowa. Installations in the homes or places of business of oil burner dealers were not used in this analysis, making it strictly a field test. Included in the summary are tests on 29 different makes of oil burners. Thirty-three of the 200 installations were oil burning units, mostly warm air and some hot water. Efficiency as used here is "combustion efficiency" i. e., input minus stack loss. All conditions given are "as found." It is impossible to determine any average age of the installations because a number of the tests were on new jobs, and some jobs had operated as long as 10 years.

Average effi. (combustion effi.) 200 jobs.....72.3%
Average effi. 33 O. B. units.....79%
Average stack temp.....640°F.
Average stack temp. 33 O. B. units.....473°F.
Average excess air.....90%
(CO_2....8.1%)
Highest effi. of conversion job.....84.3%
Lowest effi. 51%
Lowest excess air (constant, no smoke, no combustibles) 15%
(CO_2....13.5%)
Highest stack temp.....1075°F.

The efficiency of many of the above jobs could be

greatly improved by proper adjustment of present equipment. Out of the 200 jobs,

45 needed no repairs or adjustment
35 needed new furnaces, the present one being too small for the job or beyond repair
37 needed new combustion chambers or combustion chamber repairs
50 needed draft controls
23 needed new nozzles, the present ones being damaged, too large, or too small

Most of the jobs had unnecessary air leaks that lowered the efficiency.

The efficiency of the installations generally could be improved by building the combustion chamber to fit the job. On conversion jobs the effective flue travel could be increased by proper bricking. More efficient combustion could be obtained with the proper size and shape of combustion chamber, and many cases of "pants" in oil burning furnaces could be helped, if not cured, with proper combustion chamber design. The fact is well known that a "streamlined" combustion chamber, that fits the particular burner and furnace or boiler in question, generally gives the best efficiency and most quiet operation. Yet few dealers or manufacturers *do* anything about it.

Very little need be said about the furnace angle, as that is pretty well understood. However, the fact that some of the 35 "no good" furnaces were new installations (less than one year old) leads me to remind dealers that by making such installations they are making "black eyes" for themselves and the industry.

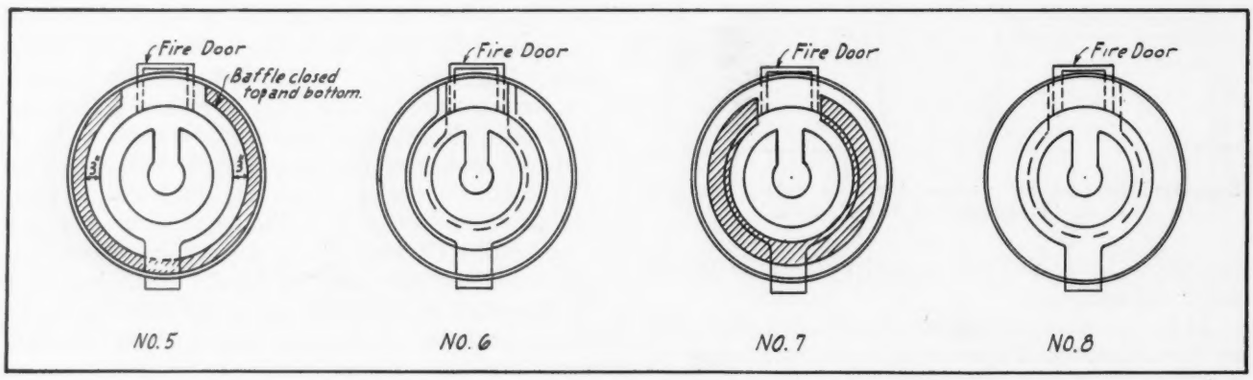
Installing burners without adequate draft control can be laid to ignorance and to cut-price selling. The same can be said of improper nozzle size and wasteful air leaks. If a dealer will put himself to a little trouble, he can very easily determine the proper burner size for a given job. Air leaks, once their seriousness is understood, can be overcome simply by being a little more careful.

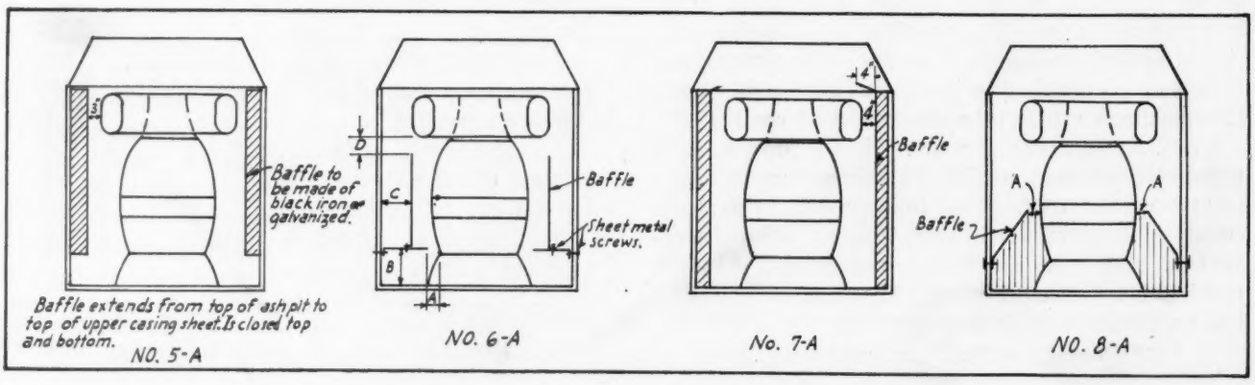
The 45 burners that were found O. K. are a testimony to the fact that it pays to understand oil heating before attempting to install oil burners. Experience is, of course, an important factor, and did play an important part in these jobs.

It was observed also that the towns in which oil heat enjoys the greatest popularity are those in which clean, dependable fuel oil is furnished to the customers. The oil companies who furnish the other kind are just as guilty of giving the industry a "black eye" as is the careless installer of burners.

Four Easy-to-Install Top Radiator Baffles

A CONTRACTOR requests suggestions for easy-to-install baffles for cast iron, top radiator furnaces which are to be converted from gravity to blower air flow. The four baffles shown below were selected from a series of articles on this subject published a few years ago. The features of these ideas are ease of installation and plain surfaces without "tricky" corners, filler plates, etc.





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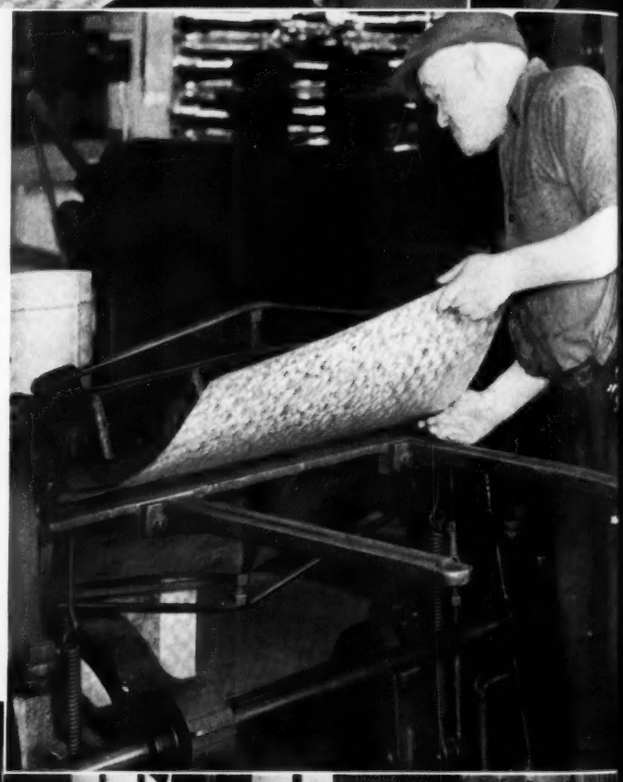

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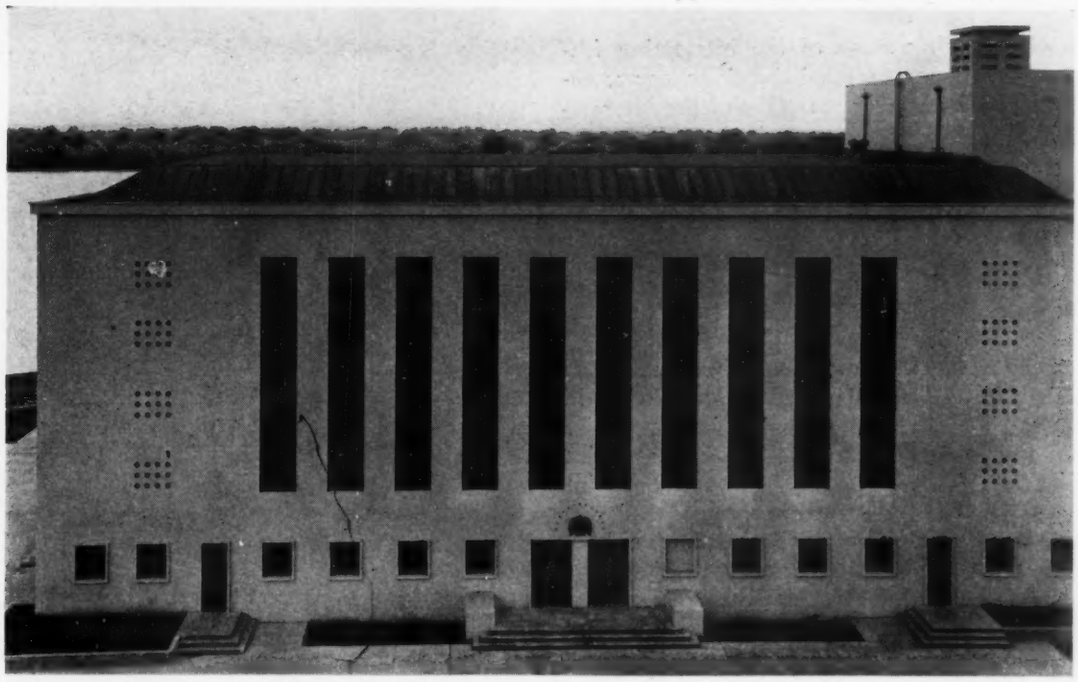


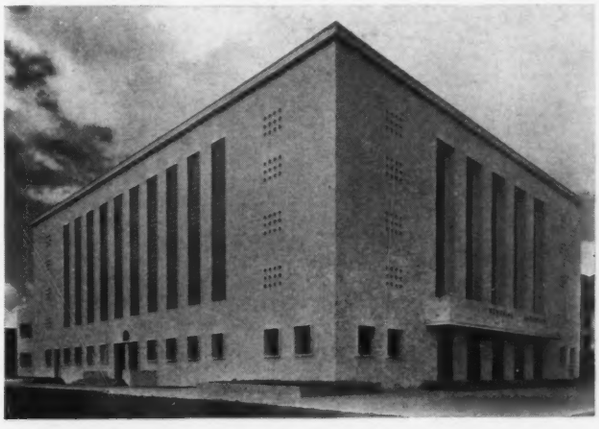
Gutter and Roof Expansion Problems On the Burlington, Iowa, Auditorium

THERE has just been completed in Burlington, Iowa, a Memorial Auditorium which has attracted considerable architectural attention because of the beautiful simplicity of the exterior and the sensitive handling of window and wall areas. The monolithic concrete building was designed by Robin B. Carswell, architect for the City of Burlington, and approved by the Treasury Department, Procurement Division and the Public Buildings Branch.

To protect the smooth, unbroken areas of white wall, a projecting cornice and parapet conceals a deep, built-in gutter with inside drains. The cornice proper is unobtrusive (see exterior photographs) and is concrete, monolithic with the wall. Extending upward and back from the gutter is a low-pitched, copper-covered roof—mansard style—and behind that the wide expanse of built-up roof. The long side of the copper roof is over 140 feet long; the unbroken side roof is about 108 feet long.

The sheet metal contractor who laid the copper roof is the Capital City Sheet Metal Co., Des Moines. M. Waldinger, one of the Waldinger brothers, proprietors of the Capital City company, reports that all the sheet metal material for the building was fabricated in the Des Moines shop and trucked the 185 miles to Burlington. Four men were used in erection with C. L. Tew as foreman. Work was started on December first, 1938, and completed on December 22, 1938. Despite the time of year, says Mr. Waldinger, only four hours time was lost, but two hours after the work was completed a heavy snow storm tied up all building work for some time.

Ten thousand pounds of copper were required.



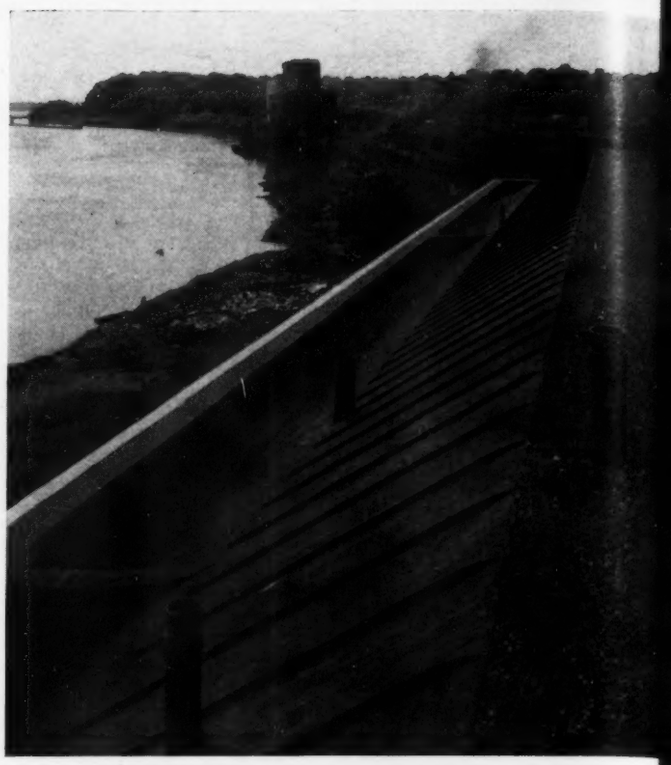
At top of page and above—Two exterior views of the beautiful Memorial Auditorium. The copper roof—standing seam—covering three full sides and a part of the fourth side, shows in the upper photograph.

Gutter Expansion and Contraction

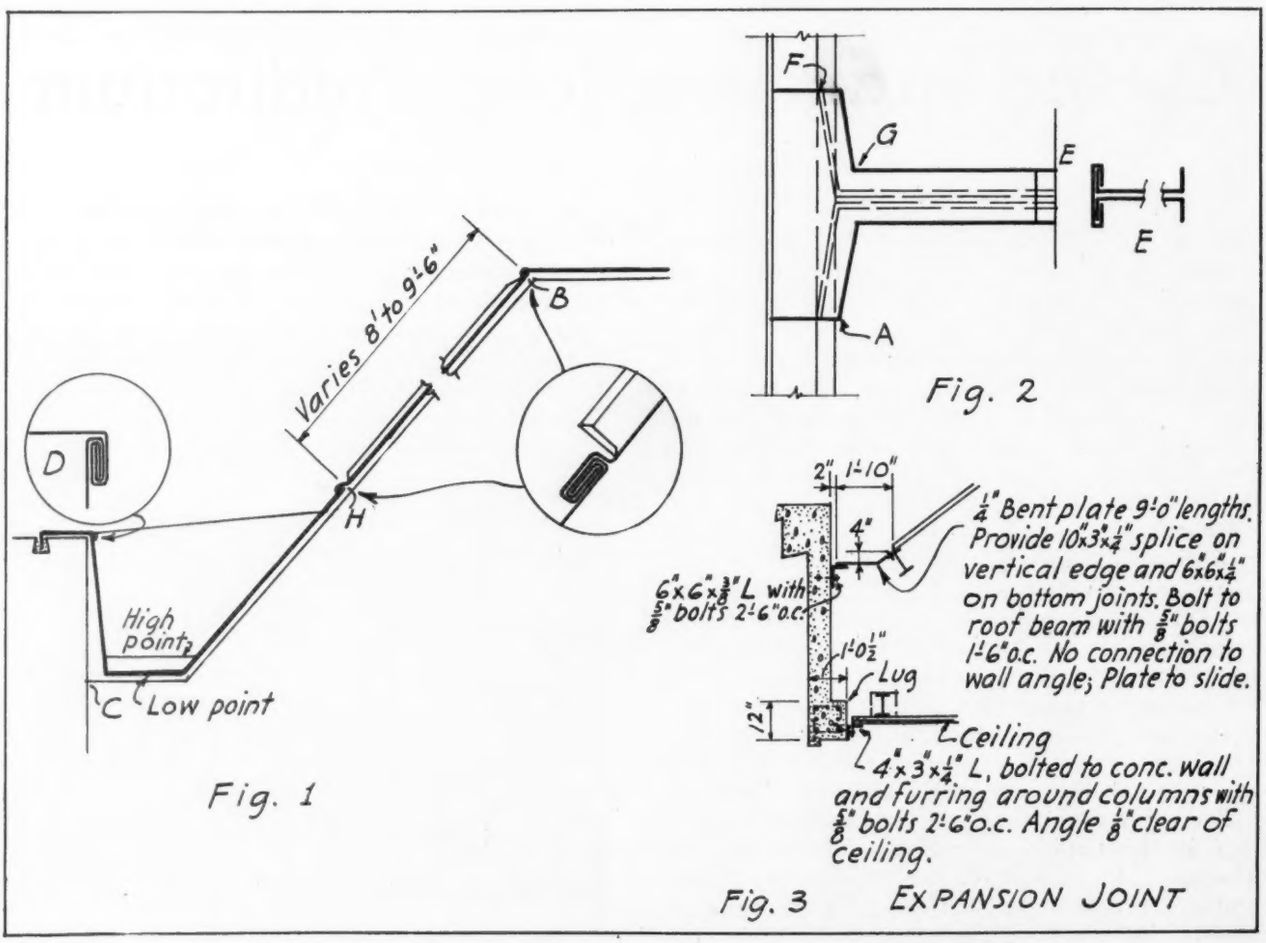
Further describing some of the interesting features, Mr. Waldinger supplied the sketches accompanying this article and says: "One of the interesting features in the construction of the roof was the provision for expansion at one end of the main roof trusses. (See Fig. 3.) This made necesssary a provision in the gutter for a lateral expansion as well as for the customary longitudinal expansion. A space of three inches was allowed at the end of the roof trusses and the fill for supporting the gutter lining as shown at C in Fig. 1.

"At D, the top of the gutter, a loose, double lock was made to allow for longitudinal expansion in the gutter. The lateral expansion in the entire roof structure and the gutter takes place at point C in Fig. 1. The usual type of expansion joint was used at the high point in the gutters as shown at E in Fig. 2, except that at point A the three inches required at C was necessary to allow for lateral expansion also.

"The expansion joint cover was loose locked with a 4-inch lock at point G as the section turned into the coping remained stationary at all times. The section of the cover extending across the gutter and up to meet the standing seam of the roof



Closeup of the standing seam roof and copper gutter. The large expansion joints (which rise higher than the parapet) are clearly shown. Compare with expansion joint detail below.



Details of the gutter construction; the expansion joint for roof trusses, roofing and gutter construction of the gutter expansion joint. Sketches supplied by M. Waldinger one of the brother proprietors of Capital City Sheet Metal Co.

Office of the Capital City Sheet Metal Co., with M. Waldinger, who supplied the information published, seated at his desk.

Shop of the Capital City Sheet Metal Co., Des Moines, where all the copper pieces were fabricated and trucked to Burlington. J. Waldinger, shop foreman, is operating a Pittsburgh lock forming machine, recently added to the equipment.

remains fixed at point H, thus allowing freedom of movement at points G, A and an additional flexing movement at point F.

"At point H a loose, double lock allows longitudinal expansion between the gutter lining and the standing seam area. In the standing seam area, expansion is taken care of in the usual manner by laying standing seam sections with ⅛-inch clearance between upstanding members of the seams. The standing seam copper was laid over 1-inch of rigid insulation which in turn was laid on metal decking of 20 gauge.

"Cleats for the standing seams were held in place by sheet metal screws 1½ inches long to reach through the insulation and into the metal decking.

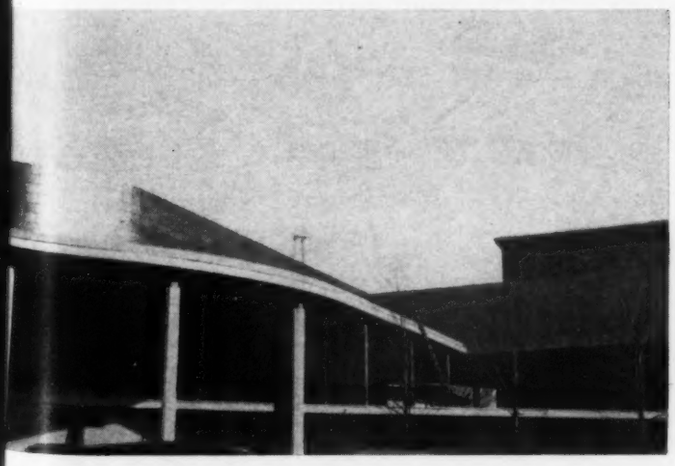
"The girth of the gutter varies from 6 feet to nearly 8 feet, the seams being transverse. Six to eight sheets were locked and soldered on a flat portion of the main roof, then formed to shape and then placed in the gutter area. This plan allowed for easier soldering and, also, more certainty of good soldering and sweating in the seams.

"There is no overflow protection in the entire gutter, so the expansion joint ends of the gutter had to come above the coping, the end at H being about 4 inches above the level of the coping. For expansion in the coping cover, which is caulked into the reglet, loose locked, cross seams were placed every 20 feet."

Coating to Keep Copper From Turning Green

THE New York World's Fair has proved a testing ground for a coating which shows promise of providing a new use for copper as a building material.

With Glyptal, an alkyd resin, as the coating, the copper on the exterior of the General Electric building at the Fair has maintained its brilliant lustre and characteristic color, instead of turning green or showing brown spots after exposure.



The surfaces of the copper panels are cross-crimped, producing striking effects with the shifting rays of the sun. The same indentations give the walls of the irregularly shaped building a shimmering effect under amber floodlighting at night.

Covering the exterior of Steinmetz Hall, the "House of Magic" and the exhibit area of the G-E building are 26,500 square feet of copper panels treated with the Glyptal coating. To provide a contrasting color, setbacks at the top of Steinmetz Hall and the rear wall of part of the building are paneled with copper treated with acid, producing artificially the characteristic color of weathered copper.

Glyptal is an alkyd resin and has been used for several years in paints and other coating materials. Among its general uses have been refrigerator enamels, automobile finishes and other exterior finishes requiring the utmost in durability.

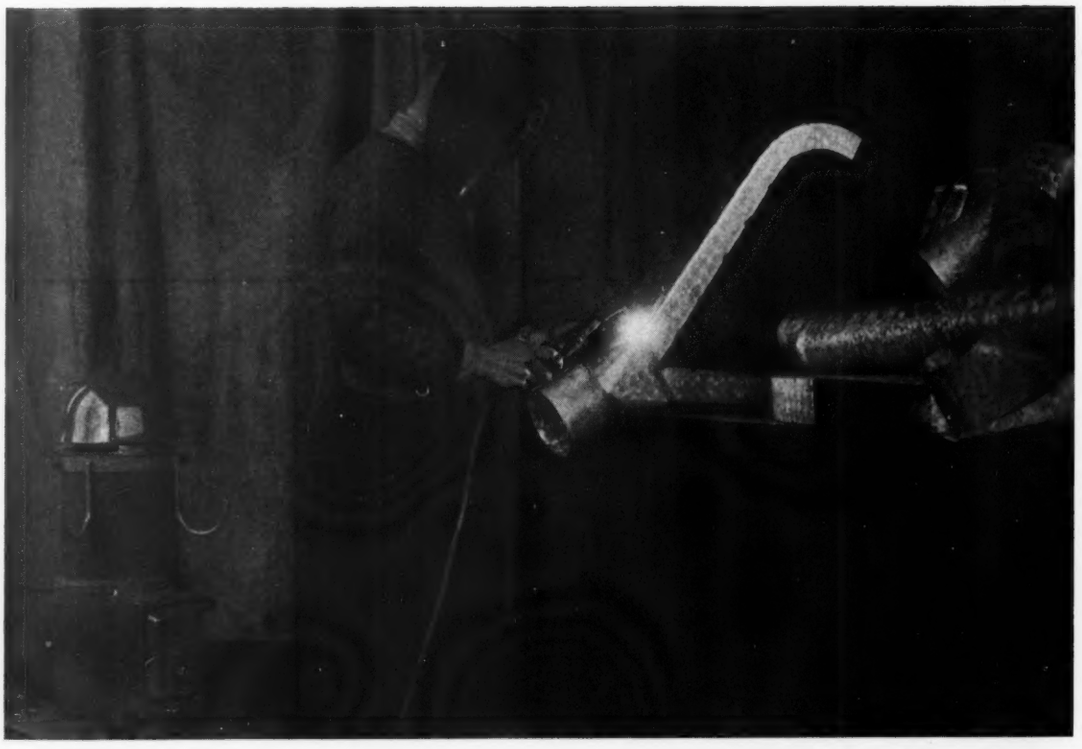


Fig. 1—Fabricating a galvanized section for a grinding machine dust collecting system by carbon arc welding at the shop of Flesch & Schmitt, Inc., Rochester, New York.

Carbon Arc Welding of Galvanized Iron

By Arthur Madsen

Welding School Instructor, The Lincoln Electric Co.

THE carbon arc welding process of welding light galvanized steel can be applied easily by sheet metal men accustomed to soldering. It gives good, uniform results in sheets as light as 24-gauge. Users of welded galvanized equipment report that the welds are just as corrosion-resisting as the galvanized metal. Welded joints are equally as good or are even superior to mechanical joints in strength, rigidity and permanent tightness, and correctly handled carbon arc welding permits costs no greater than mechanical seaming.

In Fig. 1 is shown a galvanized section for a grinding machine, dust-collecting system being fabricated by the carbon arc welding method.

Galvanizing Need Not Be Disturbed

In the past, some shops have avoided welding of ducts because of a feeling that the heat of welding would disturb the galvanizing, however, carbon arc welding, because of its low heat, produces but very little disturbance to the galvanizing. The reason is that the zone from which the coating or galvanizing appears to have been removed by the heat of welding is confined to a very limited area. Of course, the heat of welding will melt some of the zinc and some of it will go off in fumes. However, the very small extent of this zone and the fact that the galvanizing is only very slightly disturbed allows the metal to retain its corrosion resisting properties.

Tests have shown that galvanized steel which has been welded is only slightly less resistant to corrosion than the metal itself. Welded galvanized is much more corrosion resisting than metal which is ungalvanized.

Use Direct Current Only

For satisfactory results, the carbon arc welding of galvanized steel should be done with direct cur-

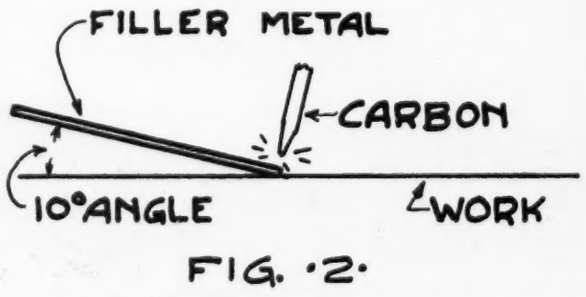


FIG. 2.

Filler metal is laid on at a 10-degree angle.

rent. Only with direct current can uniformly straight polarity (which is absolutely essential in this work), be obtained. Straight polarity (where the current flows from the electrode to the work), provides an arc which is easy to strike and hold with the carbon. The uniform direction of current flow also makes it easy to move the arc along the seam being welded. The uniformly straight polarity of direct current also assures maximum welding speed and welds which are free from irregularities. Such welds are smooth and dense.

Accurate Current Control Essential

Also important in welding thin galvanized sheet is accurate control of voltage and current to give the proper type and size of arc. The importance of accurate control is appreciated from the fact that a difference of only approximately 6 amperes of current is required for best welding of 20- and 22-gauge metal. The ability to make adjustments in increments as fine as desired frequently spells the difference between good and inferior welding of galvanized steel.

Filler metal is a long rod 3/32-inch or 1/16-inch diameter and composed of a copper alloy, such as copper, silicon, manganese, etc.

Satisfactory Carbon Sizes

Best results are usually provided in the carbon arc welding of galvanized steel by using a carbon of 5/32-inch diameter, although 3/16-inch carbons are entirely satisfactory on 16-gauge metal. Current for welding should vary from 50 amperes down to 20 amperes for the lighter gauges.

It has been found that one of the most important points to remember in the carbon arc welding of galvanized steel is that the carbon must have a long, thin taper. A standard 5/32-inch carbon should be ground in an emery wheel so that it has a 4- or 5-inch taper down to a very small point. About 1½-inch of the carbon is allowed to extend out of the electrode holder so that it will keep itself necked down and tapered.

Fig. 4—Carbon arc welds in galvanized sheet steel. A—offset lap; B—straight lap; C—plain butt; D—outside corner; E—inside fillet.

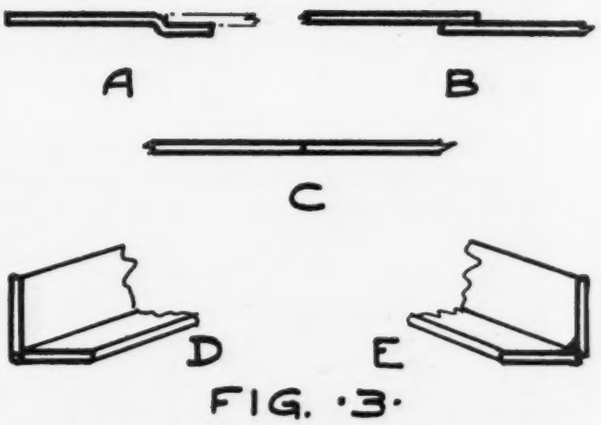


FIG. 3.

Joints in galvanized steel welded by the carbon arc; A—offset lap; B—straight lap; C—plain butt; D—outside corner; E—inside fillet. Photo Courtesy Cleveland Sheet Metal and Engineering Company, Cleveland, Ohio.

Filler metal is laid on the joint at about a 10-degree angle. (See Fig. 2.) "Striking the arc" is accomplished anywhere on the plate and the carbon is held in position until it becomes incandescent. This illuminates the work and permits sliding the carbon along the plate without actually establishing an arc. The arc is established when the carbon reaches the end of the filler rod. An advantage of this method is that it eliminates any false starts and any possible damage to the filler metal.

Arc Must Be Exactly Right

The arc to be used should be very short. It is so short, in fact, that there is hardly any arc at all. The arc can be held easily and can be advanced without difficulty along the seam. Use of a short arc and correct heat will produce welds which are extremely smooth, having the appearance of automatic production.

It is important to always play the arc on the filler metal and not on the galvanized plate. This provides proper bonding of the metal, a weld of good quality and results in minimum disturbance to the galvanizing.

Galvanized work to be welded should be designed so as to employ the best types of joints. Experience has shown that certain types of joints are somewhat more readily welded by the carbon arc than others. The following joints are given in the order of relative ease of welding: (1) offset lap joint; (2) lap joint; (3) butt joint; (4) outside corner joint; and (5) inside fillet weld. Fig. 3, A, B, C, D and E, respectively, show the foregoing various types of joints. Fig. 4 shows such joints arc welded. The letters correspond to those in Fig. 3.

The joint illustrated in the sketch, Fig. 3A, is best because when welded by the carbon arc, the metal flows practically like solder. This type of joint has the added advantage on sheet metal work of acting as a stiffener and thus preventing warping. The joint is provided by passing the work through a roll or a press brake and giving it an offset lap as illustrated.

(*Continued on page* 102)

Severely Exposed Roof, Frequently Repaired, Permanently Weather-Proofed with Long-Terne Sheets

A LITTLE more than two years ago, Contractor E. T. Bradway, Wildwood, N. J., was asked to present a roofing proposition for a local problem which had, up to then, defied solution. The roof to be laid is on Hunt's Ocean Pier, a recreation building which is built on piling on the ocean beach.

The roof structure is composed of steel trusses, wood purlins 6 inches by 10 inches, 3-inch by 8-inch wood rafters spaced on 24-inch centers, and a rafter covering of ⅜-inch yellow pine sheathing which also serves as the ceiling. The detail shows a cross-section.

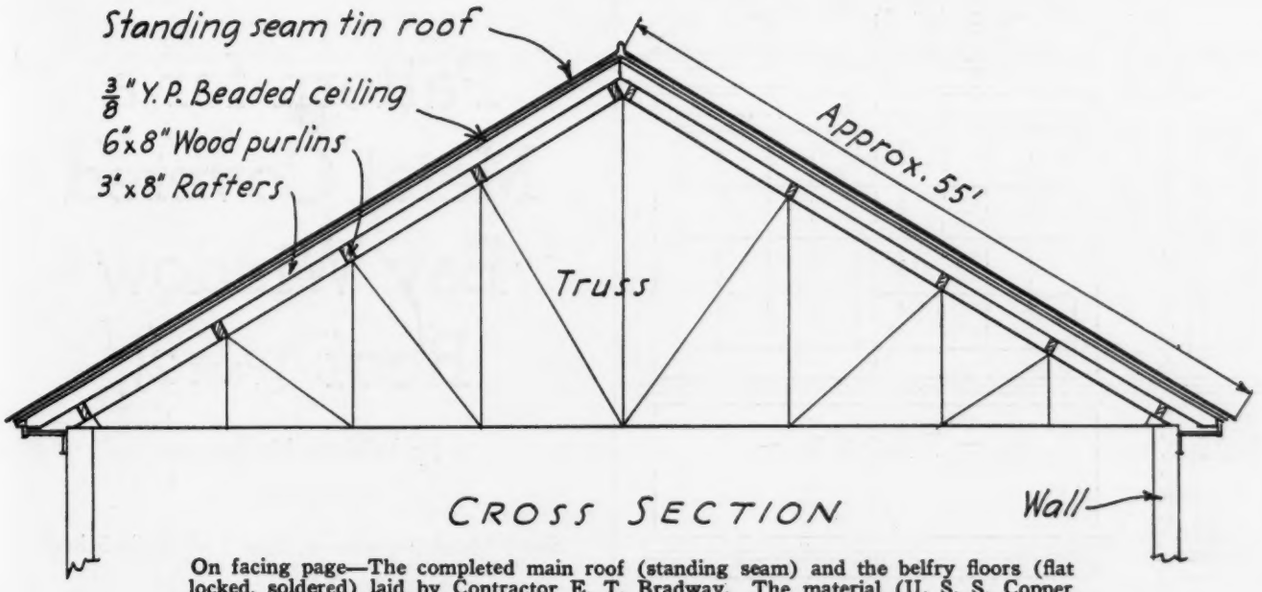
Two Old Roofs Failed

Originally, the pine sheathing was covered with 1-inch by 2-inch wood shingle lath which supported wood shingles. Because of exposure to severe winds, the wood shingle roof developed leaks. To remedy this leaking the wood shingles and the shingle lath were removed and a pitch and felt slag roof was applied directly to the yellow pine sheathing. The ⅜-inch sheathing proved too thin and frail to provide proper nailing with tin caps and 1-inch nails and during a period of about 10 years the roofing tore away several times.

During this period the building changed hands several times and each time the new owner had to make extensive roof repairs—sometimes necessitating laying a complete new roof. The present owners wished to avoid all this roof trouble and asked Mr. Bradway what he could recommend to end their troubles.

Why Terne Was Recommended

Mr. Bradway recommended long terne metal roof—"first, because such a roof is light in weight (reducing the roof load by approximately 44,000 pounds); second, because, in my opinion, long terne roofing is just about as serviceable over a long



On facing page—The completed main roof (standing seam) and the belfry floors (flat locked, soldered) laid by Contractor E. T. Bradway. The material (U. S. S. Copper Steel Ternes) and the method of laying is expected by Mr. Bradway to remain maintenance-free for many years. Above—Cross section showing roof members and materials.

period of years as any roof can be; third, because a long terne roof is as fireproof as any roof I know of; fourth, because such a roofing material can be applied in widths and lengths which enable the terne to be secured through the thin sheathing and directly to the rafters, thus reducing all danger from wind pulling the roofing loose; fifth, because the roof can be painted to match any color scheme or changed as the owners desire from time to time."

Sheets Bought in Special Sizes

The roofing was laid as shown in the sketch and in the photograph. To cover the various parts of the roof Mr. Bradway bought his terne in special sizes. He used 80 rolls of 40-pound coated (lead and tin) copper-steel, 26¼ inches wide and 55 feet long; 20 rolls, 26¼ inches wide by 33 feet long; 5 rolls, 28 inches wide, standard length; 25 rolls, 20 inches wide, standard length.

The main roof on which the above terne was laid is over the second floor ballroom and is pitched 8-inch rise per foot. The ballroom is 100 by 125 feet in dimension. The terne was laid standing seam and the widths specified above brought the seams directly above the rafters.

Other Work in Contract

In addition to this main roof there were four towers as shown in the photograph, each about 24 feet square and the two front towers required roofs or, more properly, belfrey floors and the uppermost deck. These roofs or floors are nearly flat and terne was applied with flat seams, cleated and soldered. About 20 squares, net, were required for this work.

All roofs were painted with a first metallic brown paint and a second coating of aluminum paint.

The work has now been completed about two years and seems well able to last a hundred years with proper maintenance.

Dimensions of Parts of Common Dust Collector

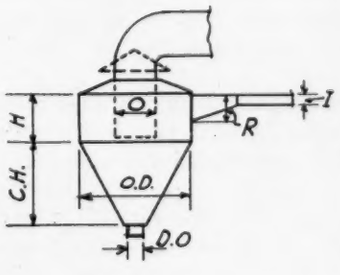


Fig. 6

I	R	O	D.O.	O.D.	H	C.H.
12"	21"x5½"	24"	8"	64"	26"	56"
14"	24"x6½"	28"	8"	71"	30"	64"
16"	30"x 8"	32"	8"	78"	35"	72"
18"	32"x 8½"	36"	10"	84"	39"	78"
20"	35"x 9½"	40"	10"	90"	43"	84"
22"	41"x 10"	44"	10"	96"	48"	90"
24"	43"x 10½"	48"	12"	102"	52"	95"
26"	48"x 11"	52"	12"	110"	55"	101
28"	54"x 11½"	56"	12"	118"	60"	109
30"	60"x 12"	60"	14"	126"	66"	116

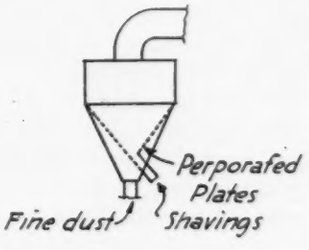


Fig. 7

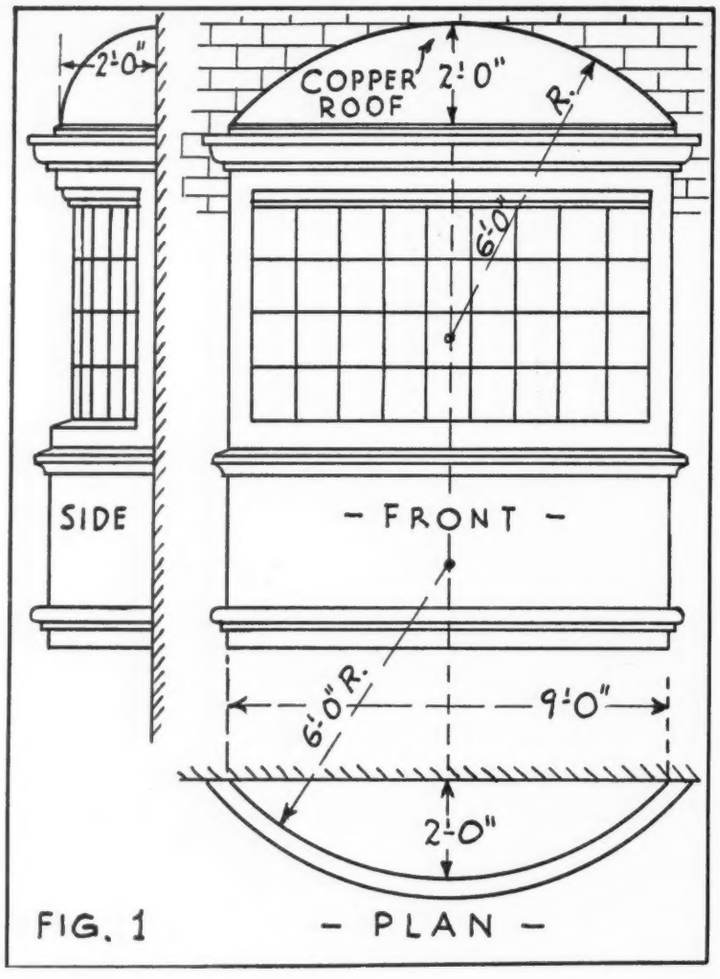


FIG. 1

Pattern for a Metal Covered Bay Window Roof* [Part 2]

By William Neubecker

Head Instructor

Sheet Metal Department, New York Trade School

Mr. Neubecker developed two patterns for this reader. The short "gore" method was presented in the August issue. The longer method requiring more material, and known as the "segment method" is published here.

Developing the Segments or Flaring Blanks Required

WHEN the dome is to be constructed from segments or flaring blanks, all seam lines in elevation will run horizontally or parallel with the lines of brick or stone joints as shown in Fig. 1. The segment method which our correspondent desires, requires considerable more time and material than the "gore" method previously described, and will be developed in Fig. 3.

Here is shown a part half elevation, a half plan at the left and a true section of the dome similar to Fig. 2. The full size dimensions and the various radii are shown in Fig. 3. Above the half plan draw the section of the dome roof representing the profile on the line *10-B* in plan. Divide the section of dome into as many division as there are to be segments (in this case five) and from these divisions drop lines to intersect the center line in plan as shown by the heavy dots on the line *10-B*. Now using *A* as center with the various dots as radii, draw arcs to intersect the wall line as shown. These arcs are necessary to find the girths of the various segments or flaring blanks which will be described as we proceed.

Now at right angles to the center line *10-A*, from the center point *A*, with which the 6-foot radius was struck, erect the perpendicular line *A-D* indefinitely. Now extend the top flare 1-*B*° in section until it intersects the line *A-D* at *C*, which becomes the center point with which to strike the flaring or segment blank *I* shown by *B*°-1.

*All rights reserved.

Next extend the second flare *d*-1 until it intersects the line *D-A* at *D* which becomes the center point for striking the second flare or segment *II* as shown by 1-*d*. In this manner all of the radii for striking the flares or segments *III, IV* and *V* are obtained but are only partly shown owing to lack of space. Thus *a* would be the partly shown radii for striking segment *III* shown by *d-8; b* the partly shown radii for striking segment *IV* shown by *8-10* and *c* the partly shown radii for striking segment *V* shown by *10-e*. The patterns for segments *I* and *II* will be developed. The other three segments *III, IV* and *V* are laid out in a similar manner.

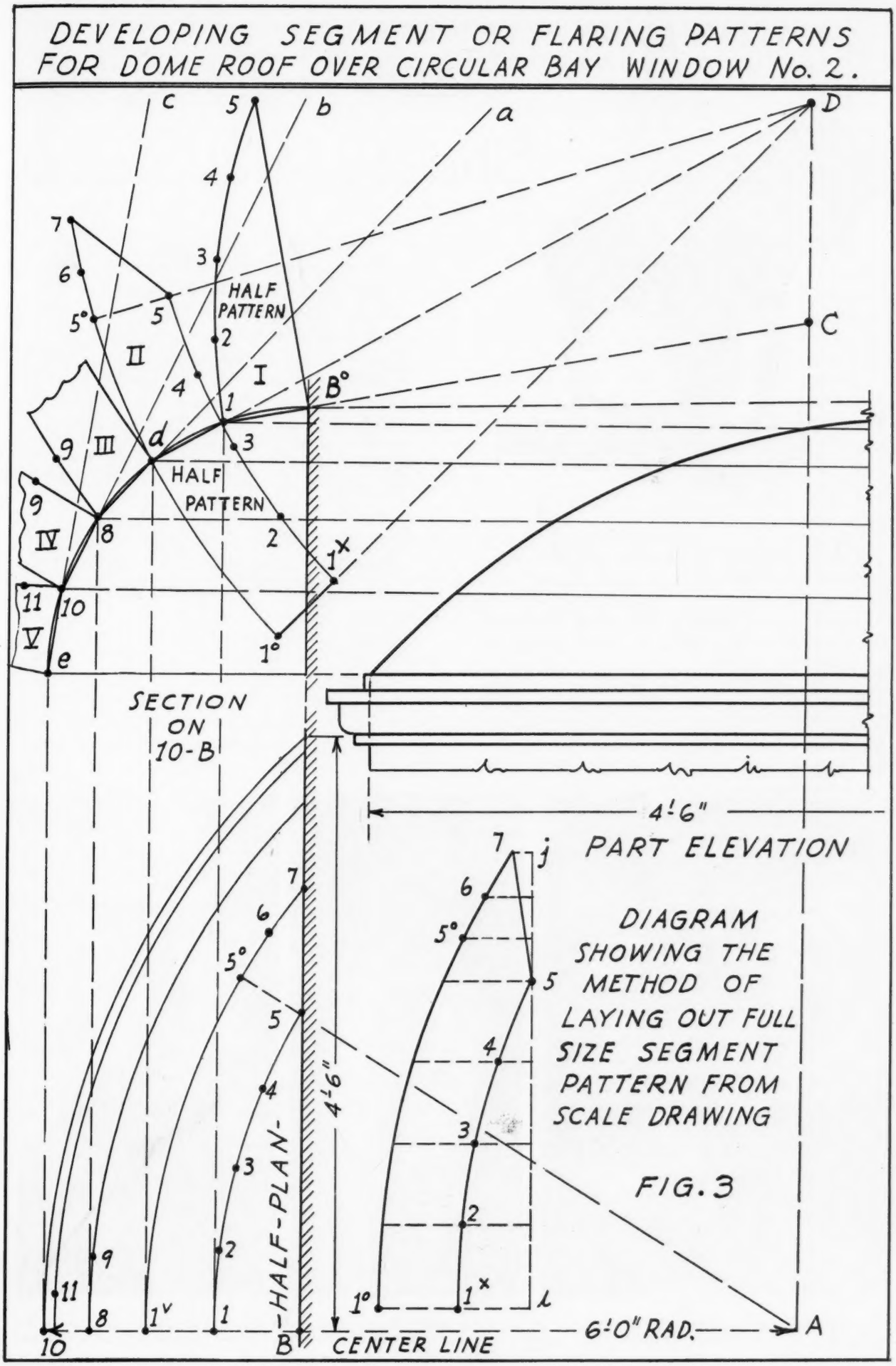
To obtain the pattern for the upper flare *I*, use *C* as center with *C-3* as radius strike the arc 1-*5*. As the girth of this arc is shown by 1-*5* in plan, set off these divisions on the arc 1-*5* in pattern as shown, and draw a line from *B*° to *5* which represents the cut against the wall. Then *5*-1-*B*° shows the one half net pattern for the segment *5*-1-*B* in plan.

In a similar manner, using *D* as center with radii equal to *D*-1 and *D-d* draw the arcs 1^x-*5* and 1°-*7* respectively. From the center *D* draw any radial line intersecting the inner and outer arcs at 1^x and 1° respectively.

Starting from 1^x set off on the inner arc the division 1 to *5* in plan as shown from 1^x to *5* in the pattern. From the center *D* draw a radial line through *5* to intersect the outer arc at *5*°. Now from the center point *A* in plan draw a radial line through *5* in plan to intersect the outer arc at of the second segment at *5*°. Space the arc *5*°-*7* in the desired equal divisions shown by *5*°-*6* and *7*. Take these divisions and set

(*Continued on page* 106)

DEVELOPING SEGMENT OR FLARING PATTERNS FOR DOME ROOF OVER CIRCULAR BAY WINDOW No. 2.



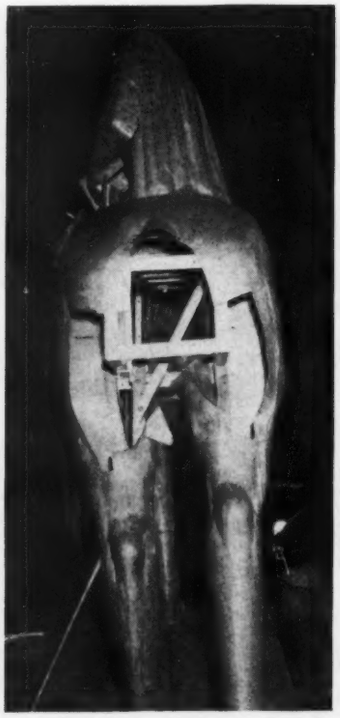
Hand-Hammered Sheet Metal Statue

Hand hammering of sheet metal for ornamentation used to be an established art in most good sheet metal shops. Power press stamping has largely replaced this old craft, but hand hammering is still understood if not so widely used. The artistry of this project is shown by the pictures.

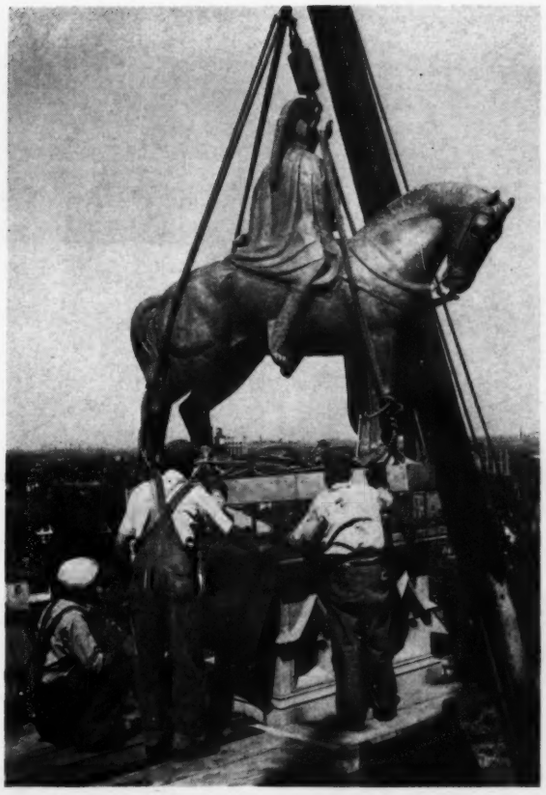
THE intricate piece of sheet metal statuary shown in the photographs was recently completed by Frank Staar and Sons, Chicago, for St. Martin's church, Chicago. The group represents St. Martin and the Beggar, a statue famous in church history.

The new statue replaces an original group carved in wood and placed on the church in 1895. Weather deteriorated the wooden statue and the pastor, Rev. F. J. Schikowski, commissioned Herman J. Gaul & Son, architects, who, in turn, commissioned the Staar firm to fabricate a metal group so constructed that exposure would have no effect. The metal chosen was lead coated copper in 24 and 32 ounce weight, the sheet metal to be placed over a brass framing.

The new statue is not an exact duplicate of the original wood statue, but, in general, the placing of the figures and the artistic conception is much the same. The Staar firm commissioned Alphonso Iannelli, Park Ridge, Ill., artist, to prepare a half-scale clay model which was approved by the architect and the pastor.



The three photographs above show construction in the Staar shop. Left—Nearly completed group showing some of the many pieces. Center—The brass framing and spacer plates which form the framework. Right—The new statue nearly ready for placing on the pedestal showing the crane boom.



Off side of the statue ready for placing on anchor bolts. This view and the outline on the facing page show the clean, smooth lines of the completed statue.

Staar artisans, together with Iannelli, spent time during several months in the Iannelli studio taking off the model full scale patterns and from these patterns hand hammering the necessary pieces of copper. The contours and rough sizes were hand hammered on sand bags, wood and lead blocks and roughly fitted together. Altogether some fifty pieces were required and each of these represented hours of work and tedious forming with hammers on temporary molds.

These roughly fitted pieces were then brought to the Staar shop where the brass framework shown in one of the photographs had been prepared and were then finally formed and fitted and joined with rivets, bolts and soldering. After all joints were soldered the joints were smoothed by sanding and the last minute touches were given the complete sections.

Although work was not carried forward steadily, the period from October, 1938, to August, 1939, was required to complete and place the statue. The complete group, including the base, weighs some 1,250 pounds and one of the touchy items in the contract was the dismounting of the old statue and the mounting of the new. Erection was handled from the street to the pedestal (some 92 feet) by a traveling crane with extension boom without mishap.

One of the interesting features of this contract is the fact that the mechanics who hammered the pieces used some ten or twelve hammers which were used many years ago by Frank Staar, the founder of the firm. Mr. Frank Staar learned metal ornamentation by hand hammering in Austria and in the 80's and 90's was one of the foremost and most widely known artisans in metal in the middle west. Some of the intricate and best known metal ornaments on old middle west buildings were conceived and executed by Mr. Staar. The mechanic who did most of the forming work is Ralph Catalano.

Frank Staar and Sons is now conducted by the three sons of Frank Staar—Rudolph, Hans and Henry—and is one of the active shops in the Chicago area.

Table of Roof Slopes*

Rise in Inches per Foot (1)	Pitch (2)	Percent (3)	Degrees	Percent of Roof Area Over Plan Area (4)
¼″	1/96	2½%	1° 11′ 30″	.02%
½″	1/48	4⅙%	2° 23′	.08%
1″	1/24	8⅓%	4° 46′	.34%
1½″	3/48	12½%	7° 7′ 30″	.79%
2″	1/12	16⅔%	9° 28′	1.4%
2½″	5/48	20⅚%	11° 46′	2.15%
3″	1/8	25%	14° 2′	3.1%
4″	1/6	33⅓%	18° 26′	5.4%
5″	5/24	41⅔%	22° 37′	8.3%
6″	1/4	50%	26° 34′	11.8%
7″	7/24	58⅓%	30° 15′	15.8%
8″	1/3	66⅔%	33° 41′	20.2%
9″	3/8	75%	36° 52′	25.0%
10″	5/12	83⅓%	39° 48′	30.2%
11″	11/24	91⅔%	42° 30′ 30″	35.6%
12″	1/2	100%	45°	41.4%
14″	7/12	116⅔%	49° 24′	53.7%
16″	2/3	133⅓%	53° 8′	66.7%
18″	3/4	150%	56° 19′	80.3%
20″	5/6	166⅔%	59° 2′	94.3%
22″	11/12	183⅓%	61° 23′	108.8%
24″	1	200%	63° 27′	123.6%

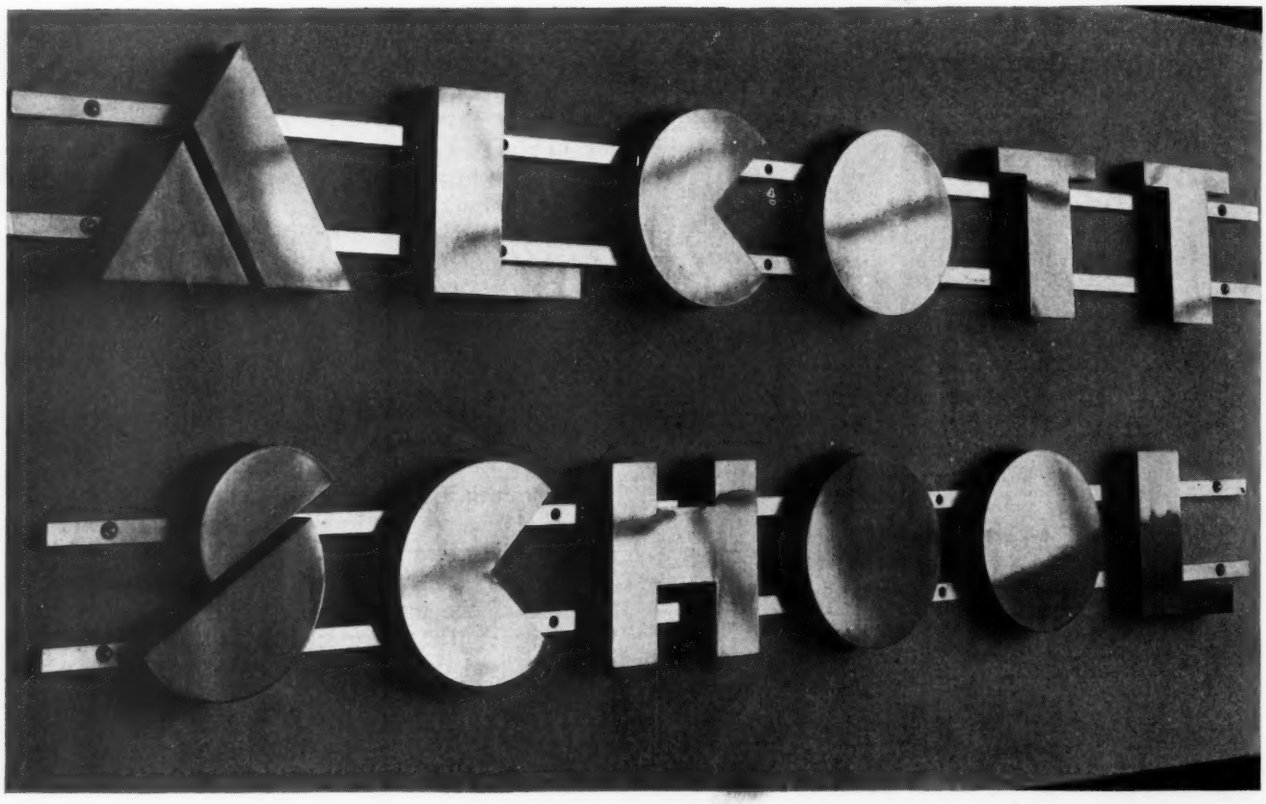
(1) The rise, measured in inches, per horizontal foot.

(2) The ratio, or proportion, of the height of the top of the roof, to the total width of the building measured from eaves to eaves. This is based on a common A type roof. For a single slope roof, use double the width of the building.

(3) The ratio, or proportion, of the height of the top of the roof to ½ the width mentioned in (2).

(4) The amount of the horizontal or plan area, which must be added to this area to find the actual area of the sloping roof. No allowance is made for over-hang. For example: A building 20 feet × 40 feet has a roof slope of 9 inches per foot. The plan area is 800 square feet, and the roof area is 1000 square feet. (800 plus 25% of 800.)

*From Zinc Workers Manual, American Zinc Institute.



Kansas Contractor's Profitable "Specialty" is

Modernistic Sheet Metel Letters

By Dwight Abbott

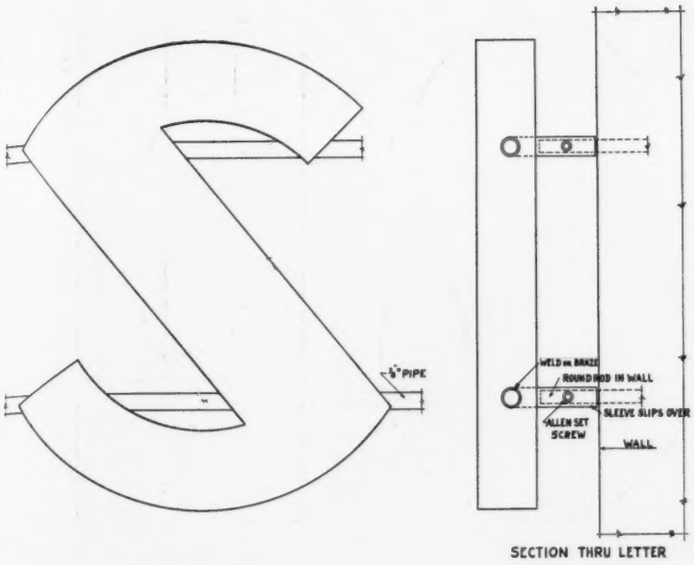
AN interesting sheet metal "specialty" which has done a good job of selling the work of his shop to architects, Leonard L. Dees, owner and operator of the Kansas Sheet Metal Co., of Topeka, Kan., reports, is the sheet metal letter, for use in outside signs—building and shop names, etc.

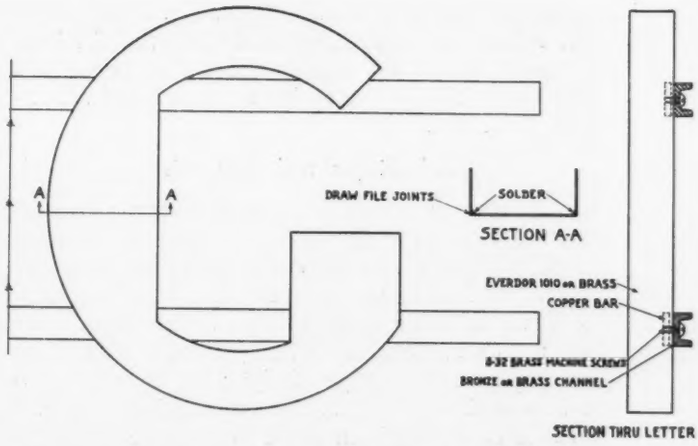
The development of this "specialty" began several years ago when Mr. Dees experimented very modestly with letters of several different materials, sizes and shapes. During this same development methods of forming, hanging and finishing were also under study. The result is sheet metal letters like those shown in the accompanying photographs. Generally speaking, this development has lead to a modernistic letter, sometimes known as "modern block" which is well suited to the bright, highly colored exteriors of present day store modernization.

The extreme care with which the metals are put together, the use of only prime, heavy gauge material and the insistence that every single letter be constructed "perfect," has given the work a wide appeal on the basis of quality. This insistence on perfection has also kept business in "letters" in the high profit bracket. Signs constructed of these letters, which are a block type—that is, one or two inches deep—while they find a ready market, are still unusual enough to bring a good price for the work, Mr. Dees reports.

The letters, which may be of any size, are made out of Everdur, commercial brass, copper, or Galvaneald iron. They are lacquered; this finish holds for one or two years without relacquering. They are, therefore, practically a permanent fixture to the building front.

Experiment with various letter styles has developed a letter that is well shaped, without a visible flaw; with the entire face of each letter cut from a single piece of metal and showing none of the seaming where the strips that form the edges meet the face. A very minimum of visible seaming around the letter edges is insisted upon. Hollow inside, these





Above and left two methods developed for holding letters away from the wall. "S" is supported on pipe with a brazed sleeve. "C" is supported on angles and is used where letters are close to the wall.

letters are comparatively light in weight and easy to handle.

Each letter is an individual piece of work in construction. "The surface must be flat and straight, squaring with the edges at every point—or the letter is discarded and we start again," Mr. Dees explained. Letters have been made up to four feet across in size.

Letters are nearly always supported, in place, a few inches out from the wall of the building, against which they serve as name sign. This is done either by fixing them to horizontal rods, behind, and fastening this frame slightly out from the building, or by supporting individual letters on bastions, or sleeves projecting out from the wall, and hidden from view behind each letter. The sketches show three common methods of erecting these letters.

By having the letters stand out a short distance from the wall, the effect of sun and shadows gives an ever changing pattern during the day, and adds

On facing page—A modernistic "block" letter especially developed to present large, bright surfaces in contrast to the deep shadows caused by placing the letters out from the wall. The type of hanger is shown in the sketch of the letters S and C above. Note absence of pronounced joining edges.

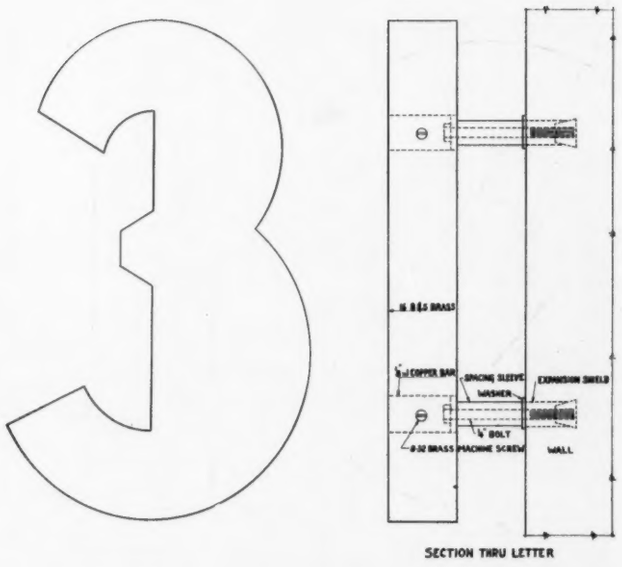
Two typical letter signs showing extreme projection from the wall. Note distinct shadows cast by the letters and clear definition of letters from background.

much to the beauty of the signs, Mr. Dees points out. Also, troughs are frequently built, at the base and just behind the letters and lights in various colors concealed in these give a striking and beautiful night effect.

Advantages and Prospects

Since they have no electric power cost, these letters are cheaper than the neon sign; many users consider these letters more distinctive and they are pleasingly free from the glare of many lamps, to be found in other types of signs. They find their best use on modernized building fronts or on shops desiring an artistic type of sign; but they are also to be found on filling stations through the area.

Little effort has been made to promote these letters intensively, Mr. Dees reports, nevertheless their sale has been good because of their popularity with architects and building designers. The letters have, in themselves, helped to promote larger work of the shop, such as the air conditioning, and sheet metal work in which this firm specializes.



Another type of support using a sleeve around anchor bolted framing bar.

70-Year Old Sheet Metal Monument

IN Belvedere Cemetery, Belvedere, Ill., there stands the old sheet metal monument shown in the photographs. The cemetery was opened in 1837, and so far as can be determined the monument was erected about 1868.

The monument marks the burial lot of the Plane family. S. F. Baker, of S. F. Baker & Sons, Belvedere sheet metal and furnace dealer says John Plane conducted a hardware store and tin shop in Belvedere for many years (25 years ago) and from his tin shop experience came the idea of constructing the galvanized iron monument. Cemetery attendants say the monument was kept painted during its early life, but year by year members of the Plane family have passed away and in the last 25 years there has been no one to maintain the monument.

A small inset plaque states that the monument was built by John Plane and Wm. Klopp, presumably a sheet metal man. The photographs show

(*Continued on page* 104)

Portrait of POWER

"TOUGH BABIES" OF THE CRESTOLOY WRENCH LINE

For the big, tough jobs that demand real wrench power, here's the Crestoloy answer. They're the "tough babies" of the Crestoloy line that combine strength, toughness and power with generous opening capacity and ability to "take it."

They are forged from "Crestoloy" steel, of course, so are relatively light in comparison to their tremendous strength. Handles on all three are tapered so a pipe handle extension can be used for added leverage. The whole wrench is heavily chrome-plated to provide positive rust protection —heads polished, handles satin-finished to prevent slipping.

New size, now ready for deliveries.

No. AC 124 is 24″ long, opens to 2-7/16″, and easily handles strains in excess of 2,500 pounds—equivalent to hanging a Ford car from the hole in the handle end. It retails for $7.50.

No. AC 118* is 18″ long, opens to 2-1/16″, and safely takes loads of more than 2,000 pounds. It costs only $5.00.

No. AC 115 is 15″ long, opens to 1-11/16″, and is easily capable of loads well beyond 1,500 pounds. $3.00 is the retail price.

Ask your hardware dealer or supply house to show you these fully-guaranteed, extra-value wrenches.

Crescent Tool Co., Jamestown, N. Y.

CRESCENT and Smith & Hemenway TOOLS

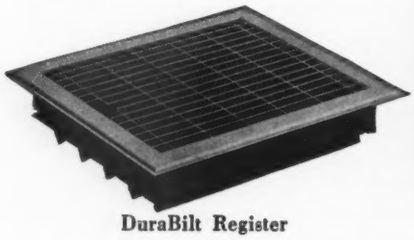
"AUER Registers Help Me To Deliver a Quality Heating Job"

—says the successful heating and air conditioning contractor

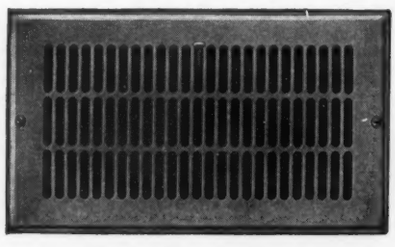
"I've used Auer Registers for years. Whether it's a straight gravity job or an air conditioned installation, Auer has the right model for the purpose. I know Auer Quality. To save a few cents, why should I take chances with underpriced registers—and get a headache? Auer products are honestly made and honestly priced. They're dependable. I've never had a customer give me anything but compliments on the registers on my jobs. I'm satisfied to stick with Auer!"

When *you* use Auer Registers, you'll find he's right. Any piece of tin can be stuck on the *delivery* end of a duct—but only a high-grade register *belongs* there. Use Auer Registers and get top quality at *standard* prices.

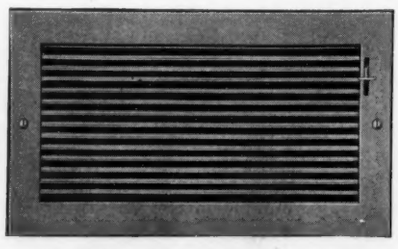
Write for Auer Book 39, showing full line of registers, cold air faces, and grilles for all purposes.



DuraBilt Register



2030 Classic Wall Register

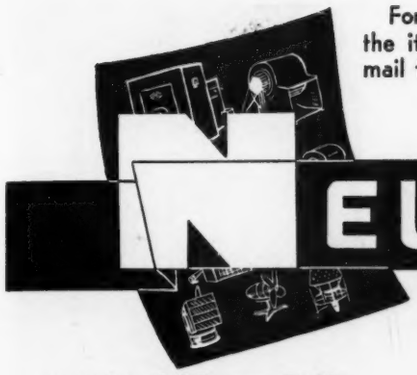


5030 Fin-Flex Register

THE AUER REGISTER COMPANY, 3608 PAYNE AVENUE, CLEVELAND, OHIO

AUER DISTINCTIVE **REGISTERS**

& GRILLES For Air Conditioning *and* Gravity



NEW PRODUCTS

For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 100 and mail to us.

● Indicates product not listed in 1939 Directory.
△ Indicates product and manufacturer not listed in 1939 Directory.

△ 179—Oil Burner Baffle

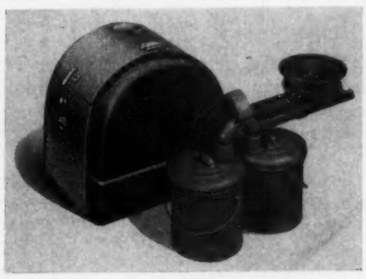
Jones Products Company, Ferndale, Michigan, announces the Jones "Radiant Heat" baffle—a cone shaped disc made of high temperature metal alloy.

The baffle sets on adjustable legs above the combustion chamber and deflects the hot-burned gases against the furnace wall. The adjustable legs allow the unit to be set at the height that produces maximum results.

◆

● 180—Yorkaire Heat Stokers

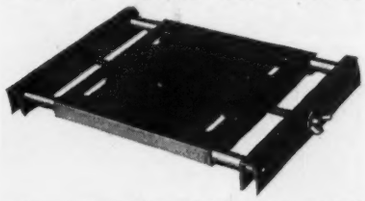
York Ice Machinery Corporation, York, Pa., has introduced a complete line of Yorkaire Heat coal stokers, residential and commercial.



There are five different coal stokers being introduced: a hopper-feed anthracite stoker, available in three sizes; a bin-feed anthracite stoker, in three sizes; a hopper-feed bituminous stoker in two sizes; a bin-feed bituminous stoker in three sizes; and a commercial bituminous stoker in two sizes.

● 181—Automatic Motor Base

Ideal Commutator Dresser Company, 1084 Park Avenue, Sycamore, Illinois, announces a new, low-cost motor base



—the automatic, which automatically maintains correct belt tension through the action of special steel springs.

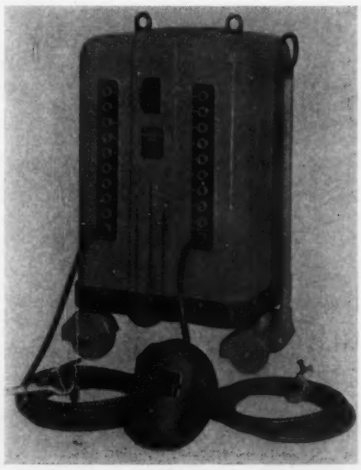
The Automatic covers all types of drives—horizontal, vertical, or overhead. Spring tension holds the motor, takes up slack, and cushions load shock. The base is constructed of steel.

◆

182—New A. C. Welders

Marquette Mandfacturing Company, 409 N. E. Johnson, Minneapolis, announces two new A. C. welders.

The 400 B T has a range from 30 to 350 amperes, with a separate tap for each of the 19 heat stages. The amperage is marked beside each tap.



The 300 B T is similar to Model 300 B, but is mounted on a new type of truck, for quick mobility. All four wheels have roller bearings and Alemite zerk fittings. Handle and pivot bearings are Oilite equipped. Range is from 20 to 250 amperes. Each heat stage has a separate tap on the panel. The amperage is plainly marked beside each tap.

All standard models are equipped with helmet, electrode holder, all necessary cables, and an assortment of electrodes.

183—Portable Airmeter

Julien P. Friez & Sons, 4 North Central Avenue, Baltimore, announces a new instrument for the measurement of static pressures, air velocities and stack drafts directly from a pointer and graduated scale.

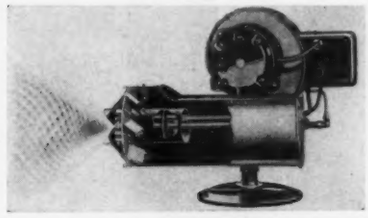
The Airmeter has a pressure range of from 0 to .3 in. of water, and a velocity range of from 300 to 2,000 fpm. The velocity scale is divided into four banks.

The Airmeter is protected by a steel slip-over cover in Gunmetal color.

◆

184—Model "O" Burner

Gar Wood Industries, Inc., Air Conditioning Div., 7924 Riopelle, Detroit, announces the production of a new model "O" conversion oil burner.



An entirely new way of mixing oil and air to produce the sunburst flame is announced. The air passes across the end of the tube with adequate rotation causing the air to spread fan-shape in the same manner as the conical oil spray leaving the jet, resulting in a mixture of oil and air in a sunflower-shaped fire.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 100.

185—Heat-Projector

Perfection Stove Company, 7609 Platt Avenue, Cleveland, has designed the Superfex "Heat-Projector" Model 1056, to provide automatic forced air heating in small homes (with or without basements), offices, halls, schools, churches, shops and service stations, where heat requirements do not exceed 66,000 Btu per hour.

This model occupies two square feet of floor space and has brown "Crincalac" finish. It has the same type of

vaporization bowl burner as the Superfex heaters, has a heavy steel combustion chamber, double air-insulating casing, electric motor-driven blower (centrifugal type) and electrical thermostatic controls.

Wiring is complete except for low voltage lead to a thermostat, which controls the fire from high to low. The blower runs on high fire and is off on low fire. Cooling effect can be obtained in summer by the use of the blower, with special switch to maintain constant circulation.

◆

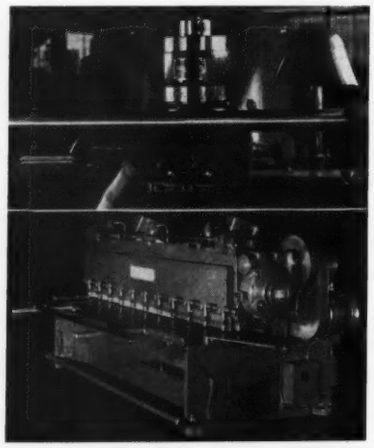
△ 186—Oil-Gas Heaters

Universal Utilities, Box B-12, Crestline, Ohio, announces a line of oil room heaters, with provision for continuous hot water.

A patent down-draft preheating duct mixes superheated air with the oil vapor to form a highly combustible oil-gas.

187—Power Back Gauge

The Cincinnati Shaper Company, Hopple, Garrard and Elam, Cincinnati, provides as optional equipment on their All Steel shear, a front controlled



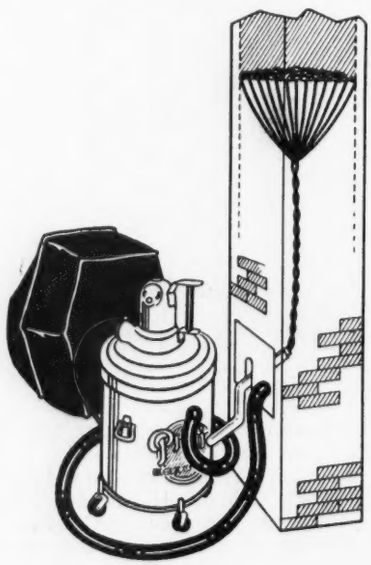
power back gauge. Finger tip push button control is convenient for the operator. Dials reading in inches and sixty-fourths or finer are mounted in front above the finger tip control. A "spotting" button sets the gauge.

◆

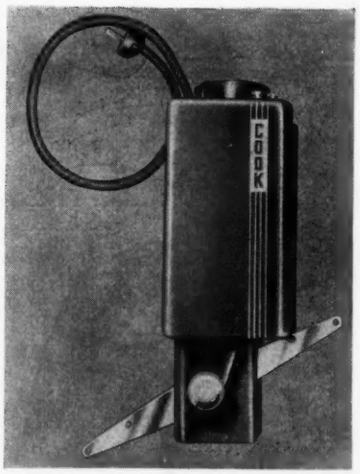
● 188—Chimney Cleaning

Electric Vacuum Cleaner Co., Inc., 1734 Ivanhoe Rd., Cleveland, announces new chimney cleaning equipment for use with the cleaners.

The complete equipment includes 12 pieces—a chimney flue brush, a duct



brush, 8 four-foot extensions, a shield and a crank. After the flue brush is inserted in the chimney opening, the opening itself is covered with the shield, which has a round hole through which the cleaner hose is inserted.



189—Heat Control

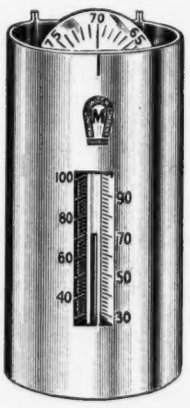
Cook Electric Co., 2700 Southport Avenue, Chicago, announces a new heat control—a complete package ready to install, with all the necessary accessories such as chains, pulleys, staples and thermostat cable for all types of hand-fired heating plants, burning soft coal, hard coal, coke or petroleum carbon. The control employs the Cook electric vapor motor.

A low-voltage transformer has been built into this "400" heat control.

◆

△ 190—Featherweight Room Thermostat

Magnet Switch Company, 356 West Huron St., Chicago, announces the Magnet thermostat, open and well ventilated with the large area of the thermostatic bar freely exposed in the air



passage. It weighs 1¾ ounces. The light weight is accomplished through simplification of design and the use of the new hard aluminum alloys for the entire structure including the cover.

To minimize the effect of wall temperatures, the new Magnet is mounted away from the wall.

◆

△ 191—Aviation Snips

Klenk's Aviation Snips, 107 E. Fifth Street, Wilmington, Del., announces double action aviation snips, for cutting ends of tubing, exhaust manifolds, stainless steel and Armco iron.

Interchangeable standard jaws are made for both right and left hand.

Always meant a lot . . .

NOW ABP MEANS MORE THAN EVER BEFORE . . .

The improved emblem of The Associated Business Papers is symbolic of its greater significance to advertisers. ¶ Its *Standards of Practice*, guide-posts of ethical business paper publishing for twenty-three years, have this year been made stronger and more enforceable than ever before. ¶ Apace with the times, its member publications are constantly making their editorial pages more dynamic . . . increasing their hold on their reader-audiences. ¶ Singly in relation to your markets, and collectively as an association, these modernized A·B·P·A·B·C publications deliver an abundance of what it takes to produce resultful advertising.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 100.

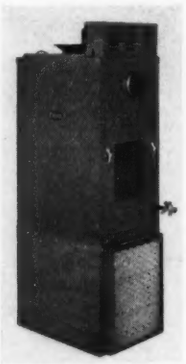
• 192—Radi-Aire

York Oil Burner Co., Inc., York, Pa., announces the York Heat "Radi-Aire," a self-contained heating system for small and medium-sized homes, old and new. It is a split system unit, designed to include winter air conditioning, year 'round tankless hot water, remote radiation and summer cooling coils may be installed.

Three sizes are available, priced for the small and medium sized home.

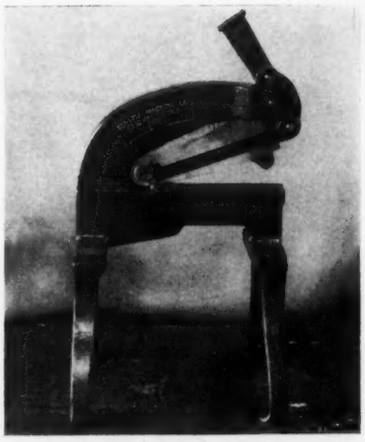
193—Low-Cost Weathermaker

Carrier Corporation, Syracuse, N. Y., is introducing a low-cost Weathermaker for homes in the $5,000 class. Direct fired for gas, the Weathermaker is factory assembled with internal wiring for automatic controls.



The casing is baked enamel finish with chrome trimmings. Summer cooling may be provided with a matched unit. Heating surfaces are of rust resisting metal.

The gas-fired model features the new Carrier Ribbon-flame burner. An oil-fired model features a new mechanical draft vaporizing burner.



• 194—Hand Slitting Shear

Service Machine Co., 164 Miller St., Elizabeth, N. J., has added a hand-slitting shear for use on sheet steel up to 10 ga.

Special blades may be substituted for cutting corrugated or special shapes such as flashing. The standard blades are made from high-chrome steel, jig-drilled to be interchangeable. Length of blade is 16 inches.

• 195—Oil, Coal and Gas

The Toridheet Division, Cleveland Steel Products Corp., Madison Avenue at West 74th Street, Cleveland, announces a new and complete line of furnaces and air conditioning units for oil, coal and gas. The company previously marketed oil heating products exclusively.

The HESS Line includes every type of Furnace to fill your requirements

The HESS FRANCHISE offers You—

One reliable source of supply with a background of 66 years of successful experience. The Hess line is complete, including welded steel furnaces up to one million B. t. u. capacity, blower filter units, oil burners, stokers, all accessories for complete installations. No job is too large or too small for Hess equipment.

Greater opportunities for sales because the Hess Furnace is distinctively different with more selling features than ordinary furnaces. It is rectangular throughout . . . not a round furnace with a square casing.

Real territory protection. No competition with other dealers in your vicinity selling the same item. Effective advertising materials, attractive consumer literature and successful sales plans, are furnished to Hess Dealers to help them secure prospects and orders.

HESS BLOWER FILTER FURNACE

Modern forced air casing in galvanized or beautiful enamel finish. This combination of Hess Furnace and Blower Filter Unit gives complete winter air conditioning and summer benefits.

FREE!
Dealer Portfolio
Complete Details
and Sales Helps

HESS WARMING AND VENTILATING CO.
Established 1873
1211-27 S. WESTERN AVE.
CHICAGO, ILL.

"MIGHTY MIDGET" Unishear, shown in action here, cuts up to 18 gauge rolled steel, sells at a price within reach of anyone.

Here's how a Chicago heating and ventilating contractor cuts openings in ducts in the shop and on the job . . . clean outlines at low cost.

When you come to bat, bidding on a contract job, have you two strikes on you before you start? Are you equipped to compete against shops with modern equipment that cuts costs, saves time and labor? Read what this Stanley Unishear user writes—

"We have been using a Unishear for ten years. It lets us economize on time and hard work . . . cut manufacturing costs and *compete successfully* with other modern, fully equipped sheet metal shops."

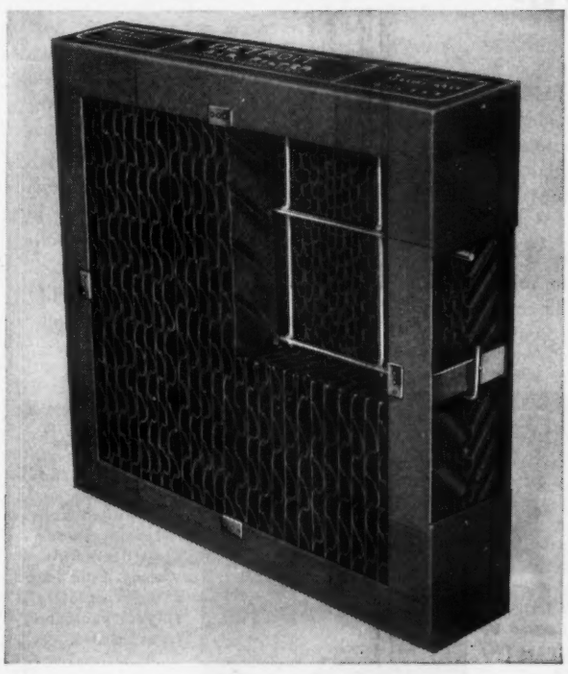
Stop competing *against* Unishear equipped shops . . . put Unishears *on your side!* They cut costs. You can use them anywhere. They cut any shape with hairline accuracy. Ask your Stanley dealer for a demonstration or write for full details. Stanley Electric Tool Division, The Stanley Works, 131 Elm Street, New Britain, Connecticut.

TRADE STANLEY MARK

STANLEY UNISHEARS THE ELECTRICALLY DRIVEN HAND SHEARS

No Spot Clogging

In The DETROIT AIR FILTER



The large cellular passages of the corrugated board used in Detroit Filters are impregnated to catch all solid particles in the air stream and are rigidly reinforced to prevent sagging. • Because these passages are equal in size, the dust builds up in a uniform layer over their inner surfaces and over the entire area of the filter at the same rate. The size of the passages plus a generous reserve of adhesive permits the dust to accumulate in layers—one upon another. This is the reason for the especially long life of the Detroit Air Filter. • The 90° angle made by the cellular passages provides a scrubbing action which accounts for the very high dust removal efficiency of this unit. Write for descriptive bulletin No. 187.

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT, MICHIGAN

Canadian Representatives: RAILWAY AND ENGINEERING SPECIALTIES LIMITED

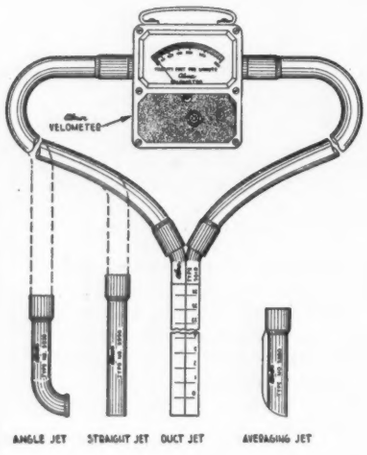
Montreal • Toronto • Winnipeg

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 100.

196—Alnor Velometer

Illinois Testing Laboratories, Inc., 420 North LaSalle Street, Chicago, announces a new development pertaining to the Alnor Velometer—a new type of jets for low range velocities.



These jets are somewhat larger and different in design from the standard jets offered for high range velocities.

The Velometer can now be furnished with a double set of jets, one for high range readings and the other for low range readings, permitting velocity readings as low as 20 fpm by means of the new tube and jet with the instrument held out of the air stream.

◆

197—Furnace Brush

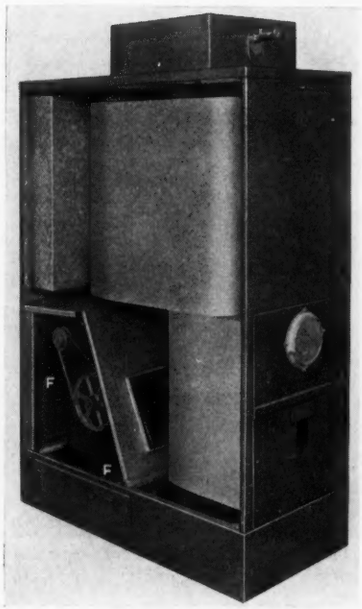
Schaefer Brush Mfg. Company, 117 West Walker St., Milwaukee, has developed a new brush for use in furnace cleaning.

The Schaefer furnace brush is obtainable in "Silver Brite" rustproof steel or black oil-tempered wire, and features a double twisted flexible stem wire. Extra full-filled with four strands of wire in a heavy 5-foot handle.

◆

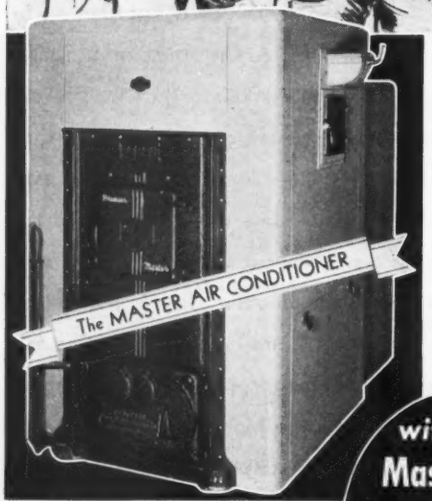
198—Series 55 Utility

The Henry Furnace & Foundry Company of 3473 E. 49th St., Cleveland, Ohio, announces a new oil-fired winter air conditioner, designed to fit the utility room of low cost houses. This Series 55 "Utility" develops 55,000 Btu's. It performs all the functions of winter air conditioning and is



very compact, occupying a floor space 21x41 in. The welded steel heating unit presents 4,800 sq. in. of heating surface. Vertical flues in the upper section add to the radiating surface. The blower forces air over the heated surfaces at comparatively high velocities and the cost is low for a complete packaged winter air conditioner. The unit is supplied without burner, and operates with any standard pot-type or rotary-type burner.

You'll Win with This Line and This Kind of Teamwork



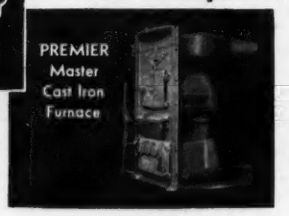
Today's most salable winter air conditioner. A balanced furnace-blower combination, equipped with multi-vane, double inlet blower . . . a set of high efficiency filters, automatic vapor humidifier and automatic electric control. Assembled complete with furnace in rock wool insulated steel cabinet, handsomely finished in baked enamel.

with Either Master Steel or Master Cast Iron Furnace

This fall team up with PREMIER and get set for your most successful season! You'll make bigger gains—come closer to your goal, with the complete PREMIER line, backed up by the amazingly effectual PREMIER dealer program.

The PREMIER line today is second to none—in completeness—in salability. It includes warm air heating, air conditioning and automatic fuel burning equipment for every purse and purpose.

Rivetted and welded permanently gas-tight. Fire brick lined. Covered by 10-year guarantee that includes grates.



Streamlined body. All parts assembled and fitted before shipping. Extra large one-piece radiator. 10-year guarantee, grates included.

And PREMIER cooperation is just as complete. This organization works shoulder to shoulder with you—providing the selling, advertising, engineering, and financing assistance so essential to your success.

Get the PREMIER dealer portfolio. Study this dealer plan. See how this program—offered on exclusive franchise—will help YOU to make more and better installations—at increased profit.

PREMIER FURNACE COMPANY
Dowagiac Michigan

PREMIER

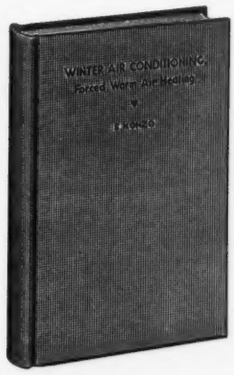
The Complete Heating Line

An Important Book All Heating Men Should Own . . . .

WINTER AIR CONDITIONING
FORCED WARM AIR HEATING

BY S. KONZO

Research Assistant Professor
University of Illinois



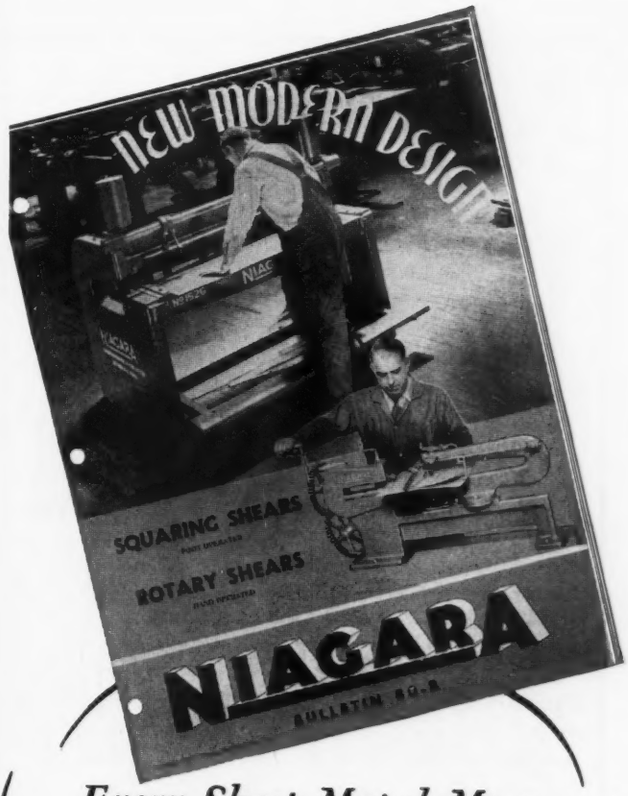
Now available in this big 532-page book is the complete record of the results of the exhaustive studies of forced warm air heating carried out over a period of several years at the University of Illinois Research Residence. This newly published volume, WINTER AIR CONDITIONING embodies ALL of the vast fund of practical knowledge which has come out of the investigations. It is filled with basic information that heating men everywhere will find invaluable as a guide to correct and up-to-date practice in the design and installation of forced air heating and residential air conditioning systems.

The author, S. Konzo, actually lived in the Research Residence during the entire period of the studies, and himself conducted or had a hand in every one of the innumerable tests that were made on the Residence forced air system. Konzo was chosen to organize and analyze the test findings for the industry in permanent book form not only because of his first hand knowledge of the test results, but also because of his ability to write clearly and concisely. In WINTER AIR CONDITIONING he has turned out a volume that will, without question, quickly become, and for years remain, the "bible" of the forced warm air heating industry.

WINTER AIR CONDITIONING belongs in the hands of every one interested in forced air heating or residential air conditioning. As this book has been published by the National Warm Air Heating and Air Conditioning Association primarily to make its invaluable data readily available to all, it is offered to the industry at the low, non-profit price of only $3.00 per copy. To obtain a copy promptly send your order and remittance today to the address below.

Those who are interested also in the Association's previous book, "Gravity Warm Air Heating, Digest of Research," which is also priced at $3.00, may obtain this book and WINTER AIR CONDITIONING together at the reduced combination rate of only $5.00.

KEENEY PUBLISHING COMPANY
6 N. Michigan Ave., Chicago, Ill.



Every Sheet Metal Man should have
THIS BOOK

Send for your copy of this Book,—it shows you how the new modern design of Niagara Squaring Shears gives you easy foot operation, clean smooth cuts, lifelong dependability and economy. It also shows the complete line of Niagara hand operated Rotary Shears for the 101 jobs requiring curved pieces. Your copy is ready for you, write for it right now.

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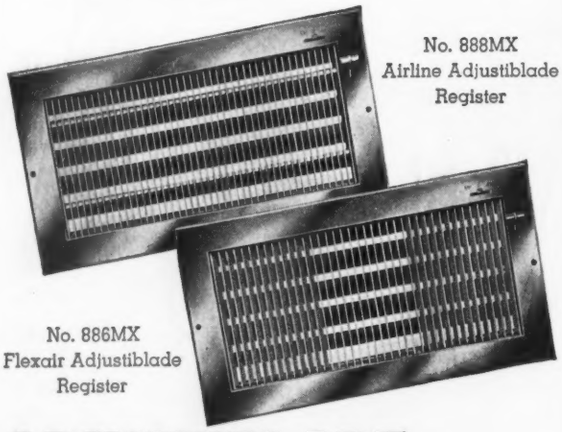
NIAGARA

NEW!



No. 888MX
Airline Adjustiblade
Register

No. 886MX
Flexair Adjustiblade
Register

ADJUSTIBLADE REGISTERS....

INSTANTANEOUS ADJUSTMENT OF AIR PATH

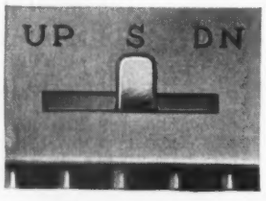
Upward ★ ★ ★

Downward ★ ★ ★

Horizontally

The new Tuttle & Bailey Adjustiblade Registers provide in a single unit the multiple features necessary to meet every air distribution problem. By means of a simple adjustment of the regulator on the face of the register the scientifically designed back blades, when opened, direct the air stream 20° upward, 20° downward, or straight.

The blades also provide for even distribution of air with uniform velocity over the entire face. Resistance is negligible.



Send at once for Brochure No. 39A giving full details of Adjustiblade Registers and new Tuttle & Bailey interchangeable frames, which make it possible to furnish every type of register with a smaller and faster moving stock.

T & B

TUTTLE & BAILEY INC.
NEW BRITAIN, CONN.
BOSTON NEW YORK PHILADELPHIA CHICAGO

Association Activities . .

Coming Conventions

1940

Jan. 22-24—National Warm Air Heating and Air Conditioning Assn. Hollenden Hotel, Cleveland. Allen W. Williams, Man. Dir., 5 E. Long St., Cleveland.

Feb. 9-10—Sheet Metal and Warm Air Heating Contractors' Association of Indiana, Inc. Annual Convention. Union Building, Purdue University. Paul R. Jordan, Executive Secretary, 631 S. Delaware, Indianapolis, Ind.

Feb. 12-14—Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors Association, Inc., Plankinton House, Milwaukee. Exhibits. Paul L. Bierasch, Secretary, 225 E. Michigan St., Milwaukee.

National

The next convention of the National Warm Air Heating and Air Conditioning Association is to be held on January 22, 23 and 24, 1940, at the Hollenden Hotel, Cleveland.

The general theme of the program being formed will be good installation, good merchandising and the promotion of the furnace system for year-around air conditioning.

The Cleveland Committee is developing plans. The committee consists of:

Harold Sharp, chairman, Henry Furnace & Foundry Company, Cleveland.
E. C. Fox, Independent Register Company, Cleveland.
G. G. Auer, Treasurer, Auer Register Company, Cleveland.
B. G. Krause, Air Controls, Inc., Cleveland.
Marion I. Levy, A. W. Lehman, Viking Air Conditioning Corp., Cleveland.
F. E. Snowberg, Minneapolis Honeywell Regulator Co., Cleveland.
S. D. Yardley, Republic Steel Corporation, Cleveland.
John Tressler, Hickman, Williams & Company, Cleveland.
Atlee Wise, Wise Furnace Company, Akron, Ohio.
C. E. Wilcox, Grant Totten Company, Inc., Canton, Ohio.
Cy Berg, Iron Fireman Company, Cleveland.
Art Rybolt, Rybolt Heater Company, Ashland, Ohio.
R. A. Jack, American Artisan, Cleveland
Clarence Olsen, American Radiator & Standard Sanitary Corp., Elyria, O.

Allen W. Williams, Man. Dir.

◆

Wisconsin

The Board of Directors of the Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors Association, Inc., has selected the Plankinton House at Milwaukee for the holding of the 26th Annual Convention on Monday, Tuesday and Wednesday, February 12, 13 and 14, 1940. Exhibits are being arranged for and the Annual Year Book Buyers Guide will be published.

Paul Biersach, Secretary.

◆

Indiana

The Program Committee of the Sheet Metal and Warm Air Heating Contractors' Association of Indiana, consisting of Louis Lehnen, Elmer Mullin and President A. E. Hartmann, have been working with Professor Miller of Purdue University to formulate a program of value to the sheet metal and warm air heating trade. It is the intention to cover subjects not stressed in last year's program.

The committee has been assured that the addition to the Union Building at Purdue will be completed well in advance of the convention date, which will make it possible to hold the entire convention under one roof. Rooms for transients will be available in this building, at costs comparable to hotel rates. Excellent meals can also be obtained in the building. There will be sufficient room for a general assembly room and for an exhibit if an exhibit is decided upon. Smaller rooms will be available for committee meetings.

Professor Miller thinks there is considerable value in an

CLIMATE Made to Order!

PROFIT by specializing in this one line that supplies all the answers for complete residential, commercial and industrial heating and ventilating, backed by 26½ years' experience building gas heating appliances exclusively. Factory engineering department to help you if you wish. Consult your nearest P-G-R jobber or dealer. Write now for literature. Pacific Gas Radiator Co., Huntington Park, Calif. (Dept. AA-10)

At Left: Summer-Winter Air Conditioner. Last word in automatic gas heating and summer ventilating systems.

Above left: Blower Gas Furnace. Specially suited to low ceiling basements. The ideal replacement unit.

Above right: Gas-fired Duct Furnace for handling large volumes of air. Sizes 75,000 to 405,000 B.T.U. May be installed in multiples of two or more in the same duct.

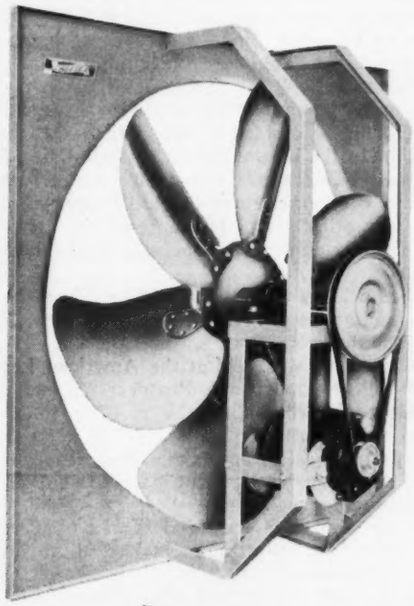
26 SUCCESSFUL YEARS

...and still growing!

FLOOR FURNACES • FORCED AIR UNITS

Pacific

BASEMENT FURNACES • UNIT HEATERS



A BETTER FAN FOR INDUSTRIAL JOBS!

The latest unit in the long line of time tested Chelsea fans is the new industrial type illustrated at left. This fan is extremely quiet because of ball-bearing construction throughout, sturdily built to very high standards, has increased efficiency and air delivery and can be had in any size from 24" up to 72".

You'll be able to make your jobs perform better and keep your customers satisfied by using the New Chelsea Industrial type fan on all your installations. Use coupon below to get further information. Mail it TODAY!

CHELSEA FAN & BLOWER CO., Inc., 370 West 15th St., New York, N. Y.

SEND COUPON TODAY FOR CATALOG

Chelsea Fan & Blower Co., Inc., 370 W. 15th St., New York, N. Y.

Gentlemen:

Please send free catalog at once.

Name .....

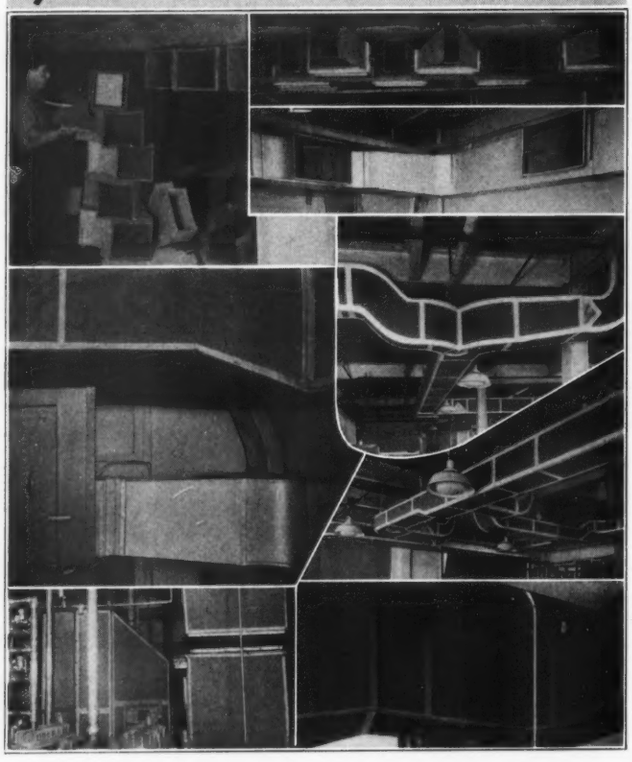
Address .....

City & State .....

Specify and Use On Every Job

DUX-SULATION

Genuine Asbestos Protected



Dux-Sulation jobs, large and small, have been installed from coast to coast . . . and in every instance have met with great success. Live dealers want . . . Easy Application . . . Complete Insulation . . . Sound Absorption . . . Beauty . . . Low Cost . . . and get all of these when they use Asbestos Protected Dux-Sulation to Insulate Ducts on Air Conditioning and Warm Air Heating jobs.

BUY DUX-SULATION IN THE
Original Factory Packed Cartons

It is easier to ship, stock, and handle on the job. Dux-Sulation comes complete. Nothing else to buy. No lugs, no screws, wire, bolts, nails or painting.

WRITE NEAREST OFFICE FOR BULLETIN 387

GRANT WILSON, INC.
4101 West Taylor St. CHICAGO

PLANT RUBBER & ASBESTOS WORKS
537 Brannan Street SAN FRANCISCO

AIR CONDITIONING UTILITIES CO.
8 West 40th Street NEW YORK

ATLAS ASBESTOS CO., LTD.
110 McGill St. MONTREAL, CANADA

Association Activities . .

exhibit, believing that business men as well as students get a better understanding if they can see as well as hear. There will be a demonstration of equipment available from the University. If a commercial exhibit is staged, the proceeds will be used to create a scholarship fund to help one or more students at the University.

The Convention date has been tentatively set for Friday and Saturday, February 9 and 10, 1940.

Paul R. Jordan.

◆

Chicago

The regular meeting of the Furnace, Air Conditioning and Sheet Metal Institute was held Thursday night, September 28th, at Rhineland Hall, Belmont and Southport Avenues.

Many important matters came up for discussion, among them being the report of the picnic committee. A talk on the Secretaries meeting in Milwaukee to which the Institute sent a delegate, was also given.

◆

Milwaukee

Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors' Association of Milwaukee met on September 11 at Guild Hall, Republican Hotel. In the absence of President Frank Kramer, Vice President Robert Schomann called the meeting to order, with an attendance of 18 firm members and 20 individuals.

Member Walters made a motion, seconded by member Arndt, that the heating group be granted permission to hold their own separate group meeting on the third Monday of the month for the purpose of solving their problems in an educational way, all members to have access to the meetings—no action to be taken on any matters without the consent of the members at the general meeting. The motion was unanimously carried.

Member Walters made a motion, seconded by member Arndt, and it was finally decided to appropriate $210 for a publicity campaign in the Milwaukee Journal's Building Section for approximately eight insertions. It is expected that this campaign will counteract some of the detrimental publicity on heating by other crafts, and impress the public at large as to the industry's predominant part in the heating field.

The Bank Nite prize was drawn by Ajax Sheet Metal Works, but not being present reverted to the treasury. Next month $2.00 will be the prize.

The October 2 meeting was held at the American Legion Alonza Cudworth Post, 1756 North Prospect Avenue, Milwaukee. President Kramer called the meeting to order, with twenty registering attendance.

Chairman Schaar of the Publicity Committee reported activities on the newspaper advertisement insertions subscribed for in the Milwaukee Journal.

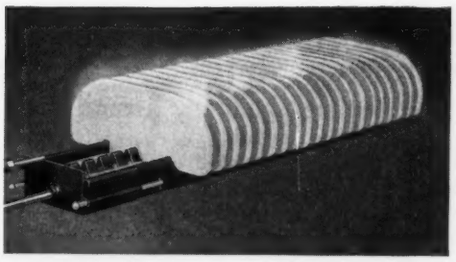
A letter from the Service Sheet Metal Works (LaCrosse) regarding the State District meeting, invited all to attend and requested reservations.

Lincoln Iron & Steel Co., a firm who disposes of steel scrap, was explained by Member Goodwin, who had some experience with them, and of whom he spoke highly.

A. Hoffmann moved and recommended, seconded by Member Stefanic, that the secretary should embody in the next meeting notice to all members a motion that the name of our association be changed to "Milwaukee Sheet Metal Contractors Association."

Bank Nite prize was won by Eschenbury Sheet Metal Works, and, not being present, the sum reverted to the treasury. Next month's prize will be $3.00.

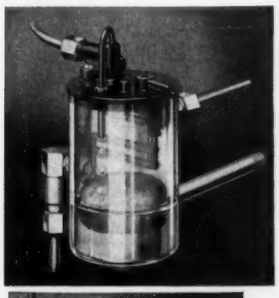
Paul L. Biersach, Secretary.



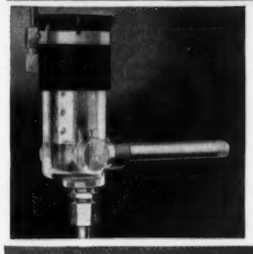
The World's Finest Vapor Diffuser Plus a Complete Line of Controls

There are at least four reasons why the Monmouth Vapor Diffuser is the world's most popular original equipment unit. *First* it has 1250% more evaporating area than pan-type units of the same size. *Second* the plates are permanent; virtually non-clogging; and easily de-limed. *Thirdly* they are odorless and will not cause condensation in the warm air ducts. *Fourthly* they are absolutely uniform in porosity.

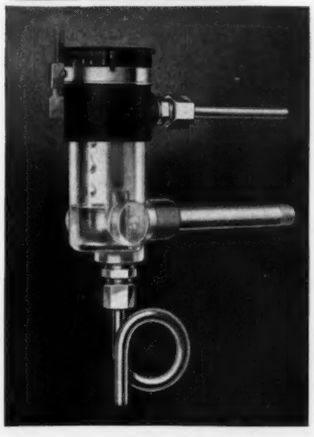
To adapt this unit to any type or price range of heating plant Monmouth offers a complete line of controls.



FLOTROL—
the first genuinely scientific float control ever developed selling at a price that fits most competitive units. Operation is automatic except during very severe weather when hand adjustment is required.



MICRO-FEED—
a completely automatic feed control for gravity heating systems. Produces automatically graduated humidity regardless of outside temperatures.



HUMIDIGRAD—
the last word in scientific automatically graduated humidity control. Includes filter and pressure governor.

★ ★ ★

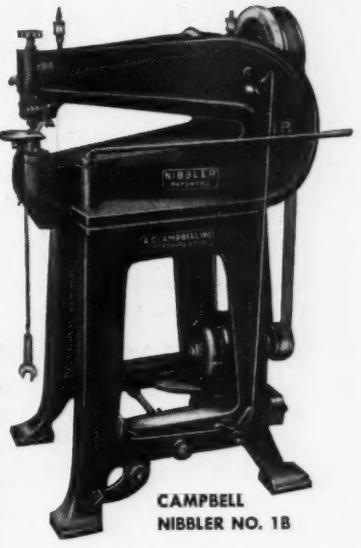
We will welcome the opportunity of sending complete information and prices to any interested manufacturer, jobber or dealer.

MONMOUTH PRODUCTS, INC.
1933 E. 61st., Cleveland, O.

MONMOUTH
The Greatest Name in Humidification

The CAMPBELL NIBBLER

reduces cutting costs 20% to 80%



CAMPBELL NIBBLER NO. 1B

● Many users report savings as high as 80% with Campbell Nibblers. These users are cutting irregular shapes in steel and other commercial materials up to one-half inch thick.

These machines give cut edges that are free of burrs—and that require little or no finishing. Campbell Nibblers do not distort materials. They do not set up internal strains or cause invisible fractures.

BUY ACCO QUALITY *in Campbell Cutting Machines, Ford Hoists, Page Welding Electrodes, American Chains, Lay-Set Preformed Wire Rope, Reading-Pratt & Cady Valves and Page Wire Fence.*

ANDREW C. CAMPBELL DIVISION
DESIGNERS AND BUILDERS OF SPECIAL MACHINERY
BRIDGEPORT, CONNECTICUT

See Our Exhibit, National Metal Exposition, Booth M-323 ★

ACCO TRADE MARK

AMERICAN CHAIN & CABLE COMPANY, Inc.
In Business for Your Safety

STATEMENT OF POLICY

The world is entering a crisis, the result of which no one can foresee. Other wars have brought inflation, followed by unemployment and depression after peace was achieved. America's experience in the World War illustrates this fact.

Much of this post-war trouble would have been eliminated by a more foresighted price policy on the part of manufacturers and distributors. Price inflation by the seller when he had a dominant position resulted inevitably in reaction with deflation, depression and suffering. Many of those price increases were not warranted.

Before such an inflationary cycle of prices is again started, we publicly pledge ourselves, as far as possible, to maintain present prices.

Further, if the materials we buy are increased in price, or the cost of labor is increased, then we pledge ourselves to raise selling prices no more than the bare increase in cost of raw materials and labor going into our products.

Further, we pledge ourselves to pass on to our customers the reduction in cost made possible by better manufacturing methods, wider distribution and technical advances in production.

THE LINCOLN ELECTRIC COMPANY

J. F. Lincoln

President

Cleveland, Ohio
October 2, 1939

News Items . . . . . .

Furnace Company Remodels

The California Furnace Company recently purchased and remodeled the building at 1276 Forty-eighth Avenue, and held a formal opening. Ray Toulbee is owner of the firm. The plant occupies 10,000 square feet of floor space. 800 square feet is devoted to office and appliance display space, with the balance being devoted to the manufacture of the California gas basement furnace.

The firm specializes in remodeling and installation of furnaces in old homes in Oakland, California.

◆

Association Sponsors Oil Burner Promotion

The Oil Burner Division of The Electrical Association of Philadelphia launched an intensive promotional activity to increase the acceptance of automatic oil heating in the Philadelphia territory on August 23rd.

The campaign, which was of six weeks' duration, opened on August 23rd and concluded on September 30th. The activity primarily was one of advertising, but included a comprehensive oil burner show of one week's duration.

The advertising consisted of large display advertisements in all Philadelphia and leading suburban newspapers. The advertisements graphically presented to the public the many favorable features of automatic oil heating and in each case, carried the trade names, as well as the company names, of the participating members of the Oil Burner Division, as well as the seal of The Electrical Association, with a statement that the Association was sponsoring the activity.

In order to arouse public interest at the outset of the activity, the campaign included an Oil Burner Show, which occupied both the first and second floors of the Edison Building.

Immediately prior to the show and during its duration, there was a heavy concentration of advertising and publicity, utilizing in addition to the newspapers, dashboard cards on street-cars and store, window and truck display cards.

A feature to stimulate public interest and attendance was a limerick contest, with a prize for the best limerick consisting of an oil burner approximating $300.00 in value, the winner to have choice of any make included in the show.

As a means of backing up the statements of salesmen and the literature of various companies participating, The Electrical Association printed 25,000 copies of a 4-page booklet, stressing the many advantages of automatic oil heating and expressing the favorable opinion of the Association for the oil burner as a household device.

◆

Home Study Courses

University Extension Division, Rutgers University, New Brunswick, N. J., announce frequent revision of both text books and assignment material to keep their courses in heating and ventilating and air conditioning in step with the constant changes in these fields.

Mathematics sufficient to enable the student to use simple formulas, and a knowledge of elementary drawing or shop sketching are prerequisites.

An outline of the courses in air conditioning, heating and ventilating, oil burner engineering, and gas manufacture, distribution and utilization are offered. Address C. G. Guam, Secretary, Bureau of Correspondence Study.

PACKAGED PROFITS

Every warm air furnace owner is a prospect for a REX AIR-PAK winter air conditioning unit. In this one package you can offer him economy, cleanliness, comfort, and health, all winter long.

There is a REX AIR-PAK for every conversion problem. Prescribe it for sick furnaces, make a welcome profit, and add a life-long customer and friend to your list.

REX AIR-PAK

- Rugged, all-steel construction.
- Capacities from 800 to 6500 C.F.M.
- Sizes from 10 to 20 inch.
- Single speed or two speed automatic bonnet controls, and gravity by-pass louvers.
- Top or rear mounted motors.
- Quiet, balanced operation.
- Large filter area with leak-proof frames.
- Overload protection on all motors.
- Each unit the result of advanced engineering and production development.
- A price that helps you sell.

A postcard will bring you specifications, prices, and promotional aids to help you plan a hard-hitting sales campaign.

Air CONTROLS INC.

Division of
The Cleveland Heater Company

1933 West 114th Street Cleveland, Ohio

Replace them with

AXIOM

When worn out filters add to the housewife's load, who gets the blame? You do. For you installed the air conditioning plant.

You can turn this situation to your advantage at a profit. Check your installations *before* that time and then *replace* worn out filters with AXIOMS. Tests made of leading filters by independent national authorities definitely prove AXIOMS unsurpassed.

Axiom Flame Proof Replacement Type Filters are highly efficient. Low in cost. Flameproof. Odorless. Intake side made of special Cactus Fibre insures large dust holding capacity and even build-up. Center section treated with odorless non-run oil, flameproofed. Outlet side made of Hair, evenly distributed to trap and hold even the finest particles of dust. All standard sizes. AXIOMS make money for you—make friends of your customers.

MAIL THIS TODAY!

AXIOM REPLACEMENT ·TYPE· **AIR FILTER**

DIVISION

BLOCKSOM & COMPANY

MICHIGAN CITY, INDIANA, U. S. A.

Please see that I receive full information on tests and prices of the amazing Axiom Air Filter.

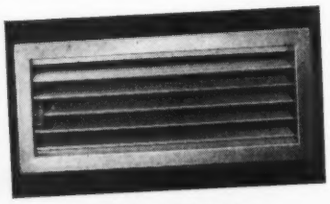
Name .....

Firm ..... Address .....

City ..... State .....

★

The Key



TO INCREASED REGISTER BUSINESS

★Dealers handling Waterloo Registers have a big advantage in being able to offer their customers Matched Design, with intakes to match all supply registers—and Adjustable Direction Control for summer and winter air conditioning. These, and many other features, offered at no extra cost, are the key to increased register business.

WRITE TODAY—for the big Free illustrated Waterloo Catalog. Learn how you can increase your profits with Waterloo.

WATERLOO REGISTER CO.

WATERLOO, IOWA SEATTLE, WASH.

Representatives in Principal Cities

WATERLOO REGISTERS

AIROTOR

Blower Wheels

TRADE MARK REGISTERED

Light Sturdy Quiet

The Torrington

MANUFACTURERS OF AIR

—News Briefs—

New Incorporations

The Banner Blow Pipe & Sheet Metal Works has been opened at 2413½ East Slauson Ave., Los Angeles, Cal., under the management of Weldon O. Harrison.

◆

A certificate to conduct business under the firm name of Barlow Sheet Metal Works, at 2209 Barlow street, Los Angeles, Calif., has been issued to the owner, Louis Steinberg.

◆

A certificate to conduct business under the firm name of D. & J. Sheet Metal Works, at 1301 South Bonnie Beach Place, East Los Angeles, Calif., has been issued to the owner, Howard C. Jensen.

◆

Herman's Sheet Metal Works has engaged in business at 5301 W. Jefferson street, Los Angeles, Cal., under the management of Sidney L. Herman.

◆

The Apex Sheet Metal Works has been established at 2732 North Main street, Los Angeles, Cal., by Edward Louis Malengo.

◆

George Rice and Glenn Meyers have engaged in the sheet metal business at 527 North Jackson, Roseburg, Ore.

◆

H. E. Stark has opened a modern plumbing and sheet metal shop in Bolivar, Tennessee, county seat of Hardeman county in West Tennessee.

◆

A certificate to conduct business under the firm name of Ventura Sheet Metal Works, at 1422 North Ventura avenue, Ventura, Calif., has been issued to the owner, Alva L. Dowers.

◆

The Winger Manufacturing Co., Inc., has engaged in business at 404 North Madison avenue, Ottumwa, Ia., under the management of Lloyd Winger. Sheet metal products, air conditioning ducts and packing house equipment is being produced.

◆

New Owners

The Western Blower Co. has succeeded to the business of the Olympic Heating Supply Co., in Seattle, Wash.

News Items . . . . . .

New Incorporations

A certificate to conduct business under the firm name of Roscoe Sheet Metal Works, at 8215 Sunland Boulevard, Roscoe, Calif. has been issued to the owners, William H. Ibisch and Willy Kendzia.

◆

The Prime Sheet Metal Works has been formed in Culver City, Cal., and is located at 3440 Wesley Street. Carl J. Schultz and Burford E. Myers are the owners.

◆

The Jack Beason Sheet Metal Works has engaged in business at 2805 Oak Grove Avenue, Dallas, Tex.

◆

The Gar-Airco Engineering Co. has engaged in the manufacture of air conditioning equipment at 3137 Ross Avenue, Dallas, Tex.

◆

George Rice and Glenn Meyers have engaged in the sheet metal business at 527 North Jackson, Roseburg, Ore.

◆

Changes in Ownership

C. E. Bade has sold his interest in the plumbing supply and furnace business of Bade & Den Herder, Lebanon, Ore., to Henry Den Herder, who will operate under the style of Den Herder's.

Obituary

J. N. McCausland died Sept. 23 at his home, 412 North Poplar, Charlotte, N. C., after a year's illness. A native of Lynchburg, Virginia, he went to Charlotte in 1884 at the age of 20. On his arrival he establihsed a metal working firm on the site of the present Broadway Theatre and four years later, his brother, Earle McCausland, became associated with him in the firm, J. N. McCausland & Co. Later they moved to 221 S. Tryon Street. For half a century he was an active merchant, served as director in the American Trust Co. and was vice president of the Citizens Savings and Loan Co. He was one of the organizers of the Greater Charlotte Club, forerunner of the Chamber of Commerce. He saw Charlotte grow from a town of 6,000 to more than 100,000. He was a wide traveler and had crossed the Equator six times and passed through the Panama Canal eight times. Two daughters, two grandsons, a brother, and sister survive.

Approximately 1 out of every 9 (11%) of all mechanical-draft burners sold

IS ALDRICH BUILT!

ALDRICH BURNERS DOMINATE THE FIELD BECAUSE

(1) They Are Better Burners For Less Money.

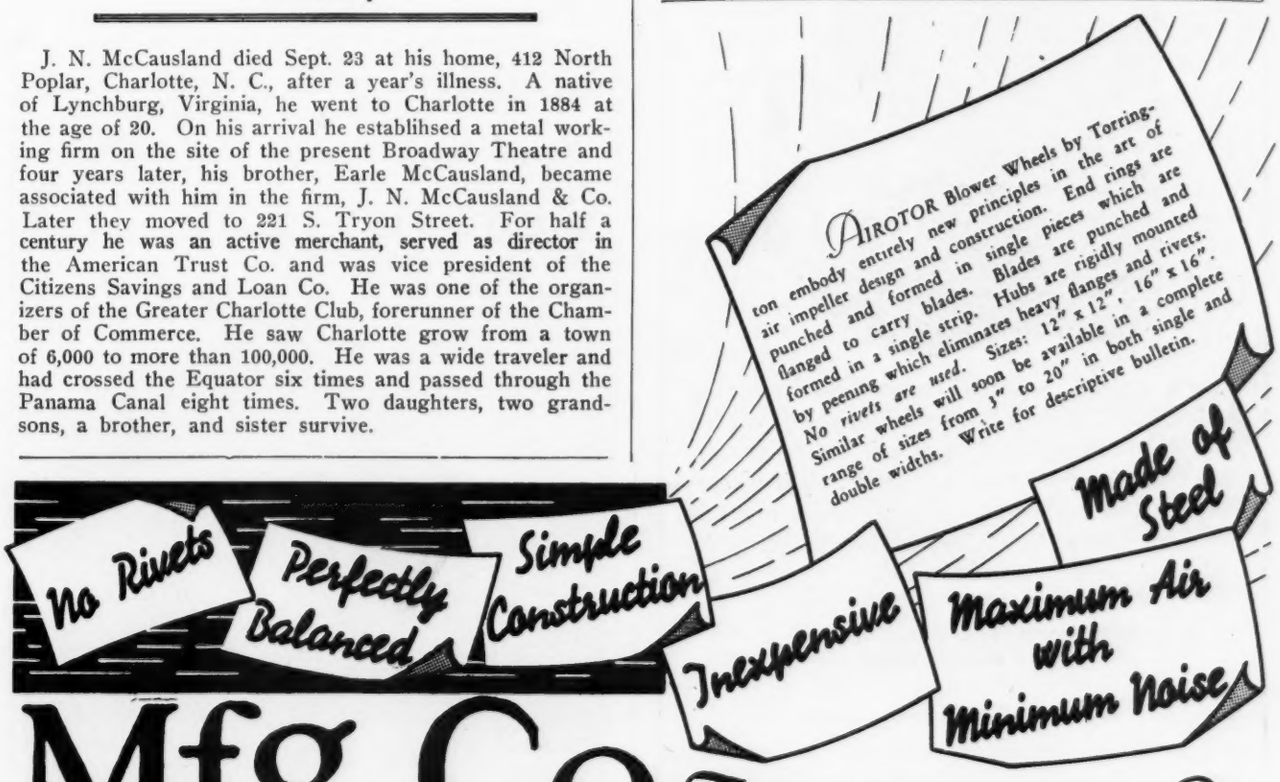
(2) They Are Sold By Better Dealers.

YOU will be a better dealer if you sell ALDRICH burners.

19 Models from ¾ to 40 GPH for No. 3, 4 or **5** fuel.

ALDRICH COMPANY, PEORIA, ILL.

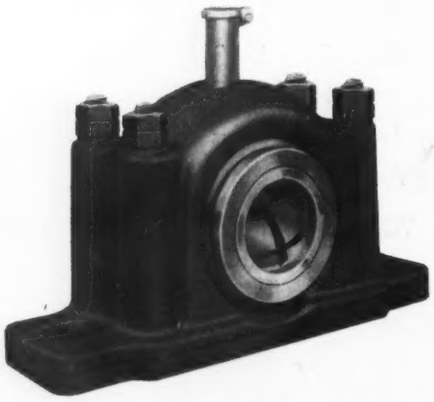
World's Largest Maker.


AIROTOR Blower Wheels by Torrington embody entirely new principles in the art of air impeller design and construction. End rings are punched and formed in single pieces which are flanged to carry blades. Blades are punched and formed in a single strip. Hubs are rigidly mounted by peening which eliminates heavy flanges and rivets. No rivets are used. Sizes: 12" x 12", 16" x 16". Similar wheels will soon be available in a complete range of sizes from 3" to 20" in both single and double widths. Write for descriptive bulletin.
No Rivets
Perfectly Balanced
Simple Construction
Made of Steel
Inexpensive
Maximum Air with Minimum Noise

Mfg. Co. Torrington, Ct.

IMPELLERS SINCE 1885

Pillow Blocks by *Randall* for important industries



Randall Universal Pillow Block—A heavy duty bearing designed for mounting in any position. It is self-aligning, self-lubricating and has two large oil reservoirs. It operates quietly with low coefficient of friction and minimum running torque. The bearing surface is precision machined or diamond bored.

Randall Flange Pillow Block—Designed for side mounting only on such applications as unit heaters or cabinet type air conditioning equipment. It is of rugged construction and has the same double reservoir oil return ball as the Universal plus all other desirable features of that pillow block.

Write for catalog describing the complete line of Randall pillow blocks.

Representatives carrying stocks

TEK BEARING CO. 177 Lafayette New York City

AMERICAN STOCK GEAR CO. 100 St. Clair Ave., N. W. Cleveland, Ohio

C. W. MARWEDEL San Francisco California

Randall GRAPHITE PRODUCTS CORP.
Dept. 1011 609 W. Lake St., Chicago, Ill.

With the Manufacturers . .

Wallin Joins DeBothezat

Guy E. Wallin has joined the sales force of the DeBothezat Ventilating Equipment Division of American Machine and Metals, Inc. Mr. Wallin will call on the trade in the Chicago area.

◆

Hayes Joins May Oil Burner

Edward P. Hayes, formerly General Sales Manager of Fox Furnace Division of American Radiator and Standard Sanitary Corporation, has joined the May Oil Burner Corporation as Vice President in charge of Sales.

Mr. Hayes brings to the Quiet May organization his many years of experience with one of the old line heating manufacturers who pioneered winter air conditioning for the residential market.

He is well known to thousands of heating dealers and jobbers for his work in conducting Air Conditioning Engineering Schools throughout the country.

◆

Whiting Holds Chicago Dealer Meet

Whiting Corporation, Harvey, Illinois, entertained over 175 Whiting Stoker dealers and salesmen at the annual Whiting Stoker Metropolitan Chicago Dealers' dinner and meeting at the Medinah Club, August 23. H. E. Markland, newly appointed sales manager for the Chicago branch operations of the Whiting Stoker Division, was chairman.

Dr W. A. Pearl of the Research Foundation of Armour Institute of Technology, where research on Whiting stokers is done, and consulting engineer for Whiting Stokers, discussed the various new models, four of which were on display. He described the various tests made and the knowledge gained from these tests.

◆

Brauer Supply Purchases New Building

Oscar P. Brauer, president, A. G. Brauer Supply Co., St. Louis, announces the purchase of a 5-story building with 85,000 square feet of floor space, built to stand a heavy floor load, at 2100 Washington Avenue.

The A. G. Brauer Supply Company distributes stoves, furnace and boiler parts and has been in business in St. Louis since 1883. Officers are Oscar P. Brauer, president; Edwin C. Shurig, vice president; and Louis Tirmenstein, secretary-treasurer

THARCO

THE LEADING FURNACE CEMENT FOR OVER 25 YEARS

For years, the country's leading furnace manufacturers and repair men have used Tharco Asbestos Furnace Cement. Why? Because Tharco has met every necessary requirement. Ask any reliable furnace mounter or repair man.

MANUFACTURED ONLY BY
THE ARMSTRONG COMPANY
DETROIT DALLAS CHICAGO

Outstanding Products For Over 25 Years

Our Northwest room is terribly cold . . . can you help us?
Sure thing . . . I'll bring up a Victor Heat Booster and get you warm in a jiffy!
FLOOR MODEL Contractor's Cost Only $6.00

Extra profits . . . contented customers and all for a few minutes' effort. That's what Victor Heat Boosters can mean to you. This ingenious device installed at the register and connected to nearest electric outlet pulls out the cold air "cork" and brings the heat up in a hurry. Quickly corrects such faulty conditions as long horizontal runs—poorly insulated rooms, etc. Ask your jobber today!

VICTOR ELECTRIC PRODUCTS, INC.
3016 Robertson Avenue Cincinnati, Ohio

VICTOR *HEAT BOOSTERS*

FLEXIBLE

is the word which best describes our new type of

REGISTER SHUTTERS

DO You Want STRAIGHT Flow of air AND CONTROL?

Then Specify "ARROWTROL."

DO You Want Varied DEFLECTION and Varied CONTROL?

Then Specify "ARC-ENG" or "BATTERY."

DO You Want a line of Registers and Grilles of marked excellence and performance, and available in ALL TYPES and in ALL PRICES?

Then Specify:

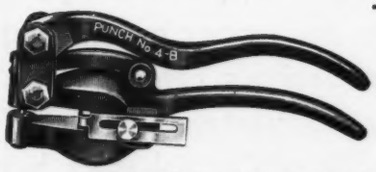
REGISTER AND GRILLE MFG. CO., INC.
70 Berry St., BROOKLYN, N. Y.

JAMES H. BAILEY, President
TROWBRIDGE WARNER, V. P. Charge of Sales
RUSSELL T. BAILEY, Director
BRUCE R. TUTTLE, Gen'l Counsel
CLIFFORD D. BAILEY, Secretary
EDWARD F. BLOM, Director
FRANK T. BAILEY, Vice President
ALFRED L. TUTTLE, Treasurer
ERIC D. MOLLANDER, Director

Write for our new catalog

WHITNEY

LEVER PUNCHES



NUMBER FOUR "B" PUNCH

This punch for sheet metal work has a capacity of ¼" through 16 gauge. Weight 3 lb. Length 8½". Depth of throat 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key. A time-saver for your up-to-date shop.

And here's another handy tool for the modern shop — the No. 2 Punch. Length 23". Capacity 5/16" through ¼" iron, weight 12 lbs., depth of throat 1 11/16". Punches and dies 3/32" to ½" by 1/64".

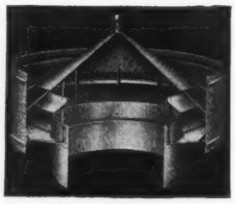
NUMBER TWO PUNCH

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

BURT STANDARD GRAVITY

VENTILATORS

Build Business for YOU



You can meet every ventilating specification with the complete Burt line. Every size and type required, advanced design, quality construction, dependable performance are talking points that make sales in the face of the stiffest competition. The "Standard Gravity" type illustrated here gives outstanding value at low cost. Let Burt engineers help you figure—no charge. Write for catalogs.

THE BURT MFG. CO.

Roof Ventilators • Oil Filters

Exhaust Heads

301 MAIN ST. AKRON, OHIO

NEED A REPAIR PART?

. . . . . if you do, you'll save yourself time and money by ordering it from Capitol's reliable stock. Parts are guaranteed to fit and the quality of Capitol stock has been proven time after time in countless installations.

Write us today for free catalog. You'll get it at once!

CAPITOL HAS IT!

CAPITOL FURNACE AND STOVE REPAIR CO.

443 E. Washington St., Indianapolis, Ind.

With the Manufacturers . . .

Mercoid Distributor in Baltimore

The Mercoid Corporation, 4201 Belmont Avenue, Chicago, announces the appointment of R. E. Michel Company, 1001 Greenmount Avenue, Baltimore, Maryland, as distributors. A complete stock of standard Mercoid controls is carried.

◆

Continental Promotes Severns

Edmond P. Severns, general manager of sheet sales of the Continental Steel Corporation, Kokomo, Indiana, since February, 1939, has been elected vice-president in charge of sales, a new position. The election was announced by D. A. Williams, president of the company.

◆

Harvey-Whipple Opens New Dealer School

Ray G. Whipple, Treasurer and General Manager of Harvey-Whipple, Inc., Springfield, Mass., announces a School of Merchandising for Master Kraft dealers.

The new school is designed to make available for Master Kraft dealers and their salesmen the lastest methods of

finding prospects, then closing those prospects without price-cutting, so that the dealer may in the end, be assured of a reasonable profit.

"How to Beat the Price-Cutter" was the main subject covered in the first classes, held during the latter part of August.

The sales tactics covered are applicable to oil burner, air conditioner, or boiler sales, and dealers were shown that by the application of these demonstrations and methods, quality merchandise at a fair price may be consistently sold in the face of all kinds of low price competition.

◆

Youngstown Sheet and Tube Appointments

The Youngstown Sheet and Tube Company, Youngstown, Ohio, announces the following appointments:

Frank C. Miller, as Western Manager of Sheet and Strip Sales with headquarters in Chicago.

John M. Tuthill, Special Sales Representative of the Flat Rolled Division, as Assistant Manager of Flat Rolled Sales, with heaquarters at Youngstown.

Arthur N. Vogt has been appointed District Sales Manager of the Youngstown Sales district.

J. F. Heil has been appointed District Sales Manager at San Francisco, succeeding A. G. Oakley, who becomes District Sales Manager of the Southern California territory, with headquarters at Los Angeles.

◆

Jas. E. McDonald

Marshall Furnace Company, Marshall, Michigan, announces the appointment of Jas. E. McDonald as general sales manager. Mr. Marshall was formerly general manager of the Lennox Furnace Company at Marshalltown, Iowa.

MORE HUMIDIFIER

for Less Money!

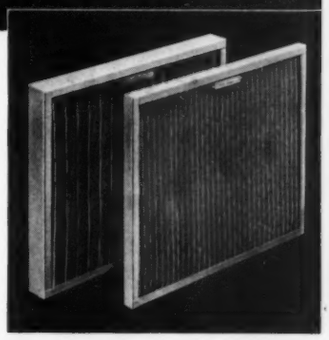
That's what thousands of furnace dealers all over the country are saying about THERMO-DRIP—the stainless steel, heat-regulated humidifier—and because it offers more for less money, it's making more money for them. You, too, can easily cash in on the extra value features of the THERMO-DRIP. Call your jobber or write us direct for full particulars.

AUTOMATIC HUMIDIFIER CO.
18th and Main Streets **CEDAR FALLS, IOWA**

THERMO-DRIP
Automatic HUMIDIFIER

MOST ECONOMICAL FOR ORIGINAL INSTALLATIONS OR REPLACEMENTS

AIR-MAZE *Kleenflo*
PANELS
for
Air Conditioning And Ventilating Systems



Permanent • Cleanable • Efficient • Low-Priced

The new AIR-MAZE air filter panels have a tested efficiency of 98% to 99.6% efficiency with extremely low pressure drop. Yet their initial cost is only slightly higher than that of conventional throwaway filters.

Cleaning, a simple inexpensive operation is required only at long intervals. After each servicing—costing only a few cents—KLEENFLO panels *again have the performance and characteristics of new filters.*

Of all-metal construction KLEENFLO panels are fire retardant. APPROVED BY THE UNDERWRITERS LABORATORIES. The filters are odorless, dependable, non-clogging and will last for years. Standard in size, they slip readily into spaces previously occupied by conventional filters.

Write for Bulletin KCP 118 and prices.

AIR-MAZE CORPORATION • 5130 Harvard Avenue, Cleveland, Ohio

AIR-MAZE

6,000,000 HOMES *need* Furnace Regulators

CASH IN ON THIS PROFITABLE BUSINESS WITH

HOLD-HEET
FURNACE REGULATORS

Every one of these six million hand-fired furnace owners is a prospect—and at this low price they can afford Automatic Control. Here is your opportunity. Go after this profitable business—NOW—with HOLD-HEET.

COMPLETE—READY TO INSTALL

This dependable, time tested Regulator provides everything needed for complete furnace control—a practical unit that will give years of economical, satisfactory service. And it comes complete—ready to install—nothing more to buy.

EXTRA PROFITS

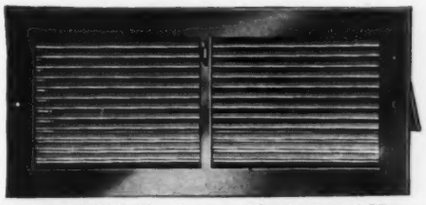
Here's extra money for you—easy, quick sales—and a good margin of profit. Now is the time to get it. Investigate, write today for prices and discounts.

Write today for
FREE BULLETIN
•
GET STARTED NOW

RUSSELL ELECTRIC CO.
342 W. Huron Street Chicago, Illinois

NEW AIR CONDITIONING REGISTERS

The New Rock Island line of Air Conditioning Registers now shown in complete new catalogue just off the press.



No. 822 Wall Register···Horizontal Vanes

The New Rock Island Air-Vane Registers are of bar type fabricated construction—Attractive Appearance—Rigid Construction—Vertical or Horizontal Vanes—Simple, secure adjustment.

New Catalogue and Dealers Net Estimating Book, a time and money saver, gives full particulars, prices, etc.

Mail Coupon Today

ROCK ISLAND REGISTER CO.
Rock Island, Ill.

Mail me a copy of your new catalogue and dealer's net estimating book.

Name .....

Street Address .....

City & State .....

REPAIR PARTS

Central can supply you in a hurry with any part you need to fit those fall and winter repair jobs. Central parts make jobs easier and easier jobs mean more profits.

FURNACE REPAIRS

CENTRAL
FURNACE & STOVE REPAIR CO.
3937 Olive St. St.Louis, Mo.

THE NEW COOK HEAT CONTROL

Write for complete information, new low prices, and details of selling plan

COOK ELECTRIC COMPANY
2670 Southport Ave. Chicago, Ill.

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 100.

232—Revolving Ventilators

Accurate Mfg. Works, 2336 Milwaukee Avenue, Chicago, is distributing three leaflets illustrating and describing their revolving ventilators—for industrial, residential or farm ventilation, also on faulty chimneys.

◆

233—Thermo-Drip Heat Regulated Humidifiers

Automatic Humidifier Co., Cedar Falls, Iowa, is distributing a 12-page catalog and an envelope stuffer with space for dealer imprint, illustrating and describing their Thermo-Drip heat regulated humidifiers with stainless steel vapor pans.

◆

234—Half-round and Square Gutter

Milcor Steel Company, Milwaukee, Wisconsin, is distributing a 4-page folder illustrating and describing Kuehn's Half-Round and Square Gutters, with streamline flutings and hemmed inner edge. Eaves trough fittings and accessories are pictured.

◆

235—Electric Temperature Controls

Gleason-Avery, Inc., Auburn, N. Y., is distributing an 8-page catalog illustrating and describing their electric temperature controls—temperature regulator combinations, damper control motors, transformer relays, stoker controls, limit controls, thermostats.

◆

236—Airjector and Rotary Ventilator

The Swartwout Co., 18615 Euclid Avenue, Cleveland, is distributing two folders covering their rotary ball-bearing ventilator, for industrial and commercial buildings, and the Airjector of which the rotary ball-bearing ventilator forms the principal part. (A special base houses the fan.)

◆

237—Sheet Strip Stock List No. 43

Central Steel & Wire Company, 4545 S. Western Blvd., Chicago, is distributing Sheet Strip Stock List No. 43—28 pages with a key to symbols on page 2. Other booklets and charts offered are: Average Properties Standard Steels, Decimal Equivalent Chart, Steel Bundling Chart, Wire Gauge Chart and Mail Order Blanks.

◆

238—Axial Flow Fan Catalog

De Bothezat Ventilating Equipment Division, American Machine and Metals, Inc., East Moline, Illinois, is distributing a 24-page catalog covering their Axial Flow ventilating sets, volume and pressure types. More than 200 axial flow pressure fans, ranging in size from 8 inches to ten feet, are included.

◆

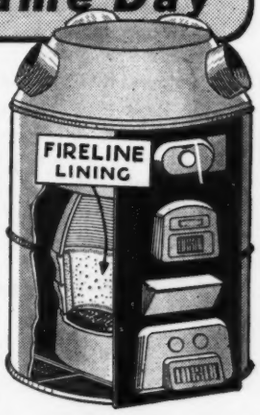
239—Cold Storage Manual

The Pacific Lumber Company, 100 Bush Street, San Francisco, is distributing a revised "Cold Storage Manual" on Palco Wool. Diagrams and charts explaining the installation in doors, ceilings, wall corners and floors of coolers and freezers form a section of the new booklet. Comparative insulation values of thirty-eight different materials is a feature.

Redwood bark from which Palco Wool is made is difficult to burn, resists decay and repels moisture, rodents and insects, is odorless and does not absorb odors. Palco Wool is delivered in machine compressed bales, 24 x 24 x 26 in. and weighing approximately 100 lbs. each.

Construction details and general specifications are included.

Firepot Repaired and Heat the Same Day



With Fireline you can repair any burned out or cracked firepot in a morning and give them heat the same day—that's service people appreciate AND WILL PAY FOR. That's only one of the advantages of Fireline, the new plastic fire brick material.

Because it is installed completely around firepot walls, one-inch or more thick and hardens into a one-piece firebrick, it gives the furnace a modern refractory lining that makes fuel burn hotter and more completely. It increases the heat producing capacity of the furnace, and uses less fuel, burns up smoke, soot, gas and ends ash sifting.

It prevents firepots from burning out, cuts coal bills materially and improves the performance of any furnace. Because of these many advantages it will support a substantial labor profit. Install Fireline in every furnace, old or new; it's part of every efficient furnace job.

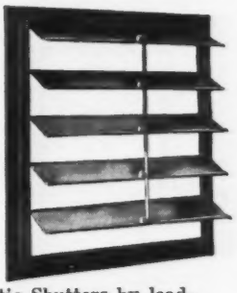
Write for Circular, Installation Data, Prices and FREE SAMPLE.

Fireline Stove and Furnace Lining Co.
1866K Kingsbury St. Chicago, U. S. A.

Protects every Firepot OLD or NEW

On Duty Every Day IN NEW YORK WORLD'S FAIR BUILDINGS

300 Elgo Automatic Shutters

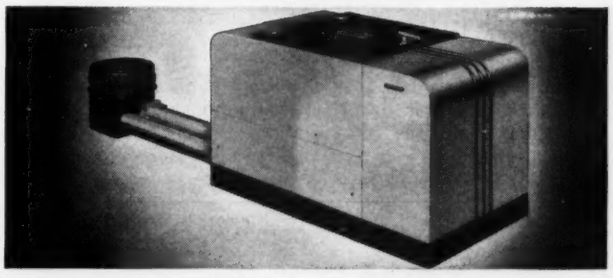


The specification of Elgo Automatic Shutters by leading consulting engineers and contractors to meet the ventilation needs of the buildings at the New York World's Fair was not just a happenstance. They selected Elgo Shutters because of their recognized superiority. Why not do likewise? Elgo Shutters are distributed by leading fan manufacturers. See your nearest distributor or write us.

Elgo Ventilating Specialties

Elgo Shutter & Manufacturing Co.
634 W. Warren Ave.
Detroit, Michigan

OVER 1,000 "HOME-TOWN" ECON-O-COL INSTALLATIONS!



WHERE SELLING IS REALLY TOUGH!

● Every manufacturer will tell you that his home town is the hardest sales nut to crack. That's why Econ-O-Col is particularly proud of its record in Rockford, Illinois where over 1,000 Econ-O-Cols are now installed, with sales increasing every year. Such intensive cultivation of "tough" territory assures a proven product, proven sales methods that can be profitably put to work in *your* community. Want to hear about it? Write or wire today!

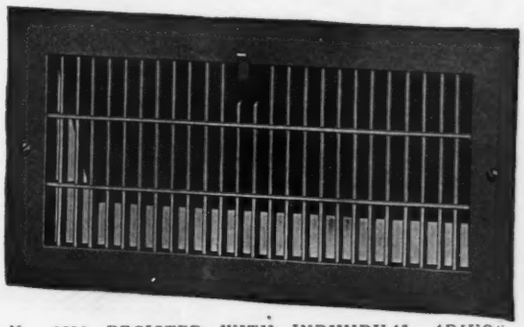
ECONOCOL Automatic COAL BURNER

ECON-O-COL

The "Stronghearted" Stoker

MANUFACTURED BY COTTA TRANSMISSION CORPORATION, ROCKFORD, ILLINOIS

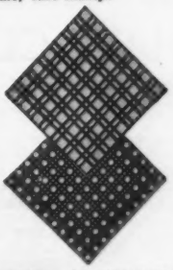
REGISTERS and GRILLES



No. 3320 REGISTER WITH INDIVIDUAL ADJUSTMENT OF GRILLE BARS—45° TO THE LEFT OR RIGHT.

Standard Stamping presents to the heating and air conditioning trade a striking new line of registers and grilles for gravity warm-air heating, air conditioning and ventilating systems. Modern in appearance and far better than average in performance, they offer the contractor an unusual opportunity to add the final touch to a good job, and at the same time, save money.

A complete catalog containing time saving charts and tables as well as the full line of "Standard Air-Control" registers and grilles is now available and will be sent on request. Write for your copy today!



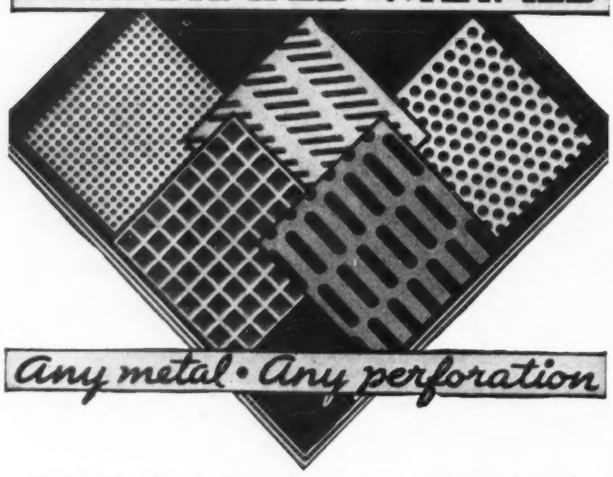
PERFORATED METALS

Screens and grilles for many industrial purposes such as sorting, sifting, and light fancy panels. We have a complete line for almost any use.

WRITE for CATALOG!

STANDARD STAMPING & PERFORATING COMPANY
3131 W. 49th Place Chicago, Illinois

PERFORATED METALS



H. & K. Perforated Metals are accurately made and embrace a great variety of perforations for use in screening, grading, ventilating and straining of different substances.

Tell us your requirements and we will send booklet showing actual sizes of perforations.

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5649 Fillmore Street, Chicago - 114 Liberty Street, New York

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Every year we ship to furnace manufacturers and to builders of unit air conditioners thousands upon thousands of Clarage Blower Wheels and Assemblies. These smaller units were designed with the same skill characteristic of the larger Clarage equipment — just as carefully constructed — just as carefully tested. And we have sizes to meet ALL REQUIREMENTS — with slow speed operation insuring SILENT PERFORMANCE. May we have your next inquiry?

SPECIFY CLARAGE for COMPLETE AIR CONDITIONING • VENTILATION • HEATING • COOLING • MECHANICAL DRAFT • FANS & BLOWERS FOR INDUSTRIAL NEEDS

CLARAGE FAN COMPANY • Kalamazoo, Mich.
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

New Literature . . . .

For your convenience in obtaining copies of new literature, use the coupon on this page.

240—The Stoker and Automatic Heating

Will-Burt Co., Orrville, Ohio, is distributing a 22 by 35 in. poster illustrating and describing the Will-Burt stoker, which compares by illustration the various parts making up the unit with earlier construction features discarded. They also offer a free copy of "Questions and Answers About Automatic Heating."

◆

241—Live and Work in Comfort

Richmond Radiator Company, Inc., Uniontown, Pa., makers af air conditioning equipment and prefabricated air conduit, is distributing a new catalog entitled "Live and Work in Comfort," covering Richmond gas air conditioners which heat, humidify, filter and circulate air. Nine units, with and without heat economizer, are rated from 75,000 to 336,000 Btu output per hour.

◆

242— Superfex Oil-Buring Gravity Furnace

Perfection Stove Company, 7609 Platt Avenue, Cleveland, is distributing a new 4-page folder, covering the Superfex modern oil burning gravity warm air furnace (Model 110E) with long flue travel, low stack temperature, and large radiating area. Form R-2239 illustrates the Superfex Model 2-E (Steel) air conditioning gas furnace. Specification sheet is included.

◆

243—Yorkaire Heat Stokers

York Ice Machinery Corporation, York, Pa., is distributing five leaflets illustrating and describing the five different coal stokers being introduced—a hopper-feed anthracite stoker in three sizes; a bin-feed anthracite stoker in three sizes; a hopper-feed bituminous stoker in two sizes; a bin-feed bituminous stoker in three sizes and a commercial bituminous stoker in two sizes.

◆

244—1940 Fitzgibbons Line

Fitzgibbons Boiler Company, Inc., Air Conditioning Division, 101 Park Avenue, New York City, announces its 1940 line of direct-fired air conditioners with a 12-page catalog covering the Directaire.

Two new models, the Special-80 and Special-120, are designed and priced for low-cost housing developments. The line comprises capacities from 80,000 Btu to 600,000 Btu at the bonnet in all types for oil, gas or stoker firing.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

179	180	181	182	183	184	185
186	187	188	189	190	191	192
193	194	195	196	197	198	
232	233	234	235	236	237	238
239	240	241	242	243	244	

Name..... Title.....

Company .....

Address .....

Are you Manufacturer——Jobber——Dealer——..

BENDING BRAKES **WHITNEY-JENSEN** METAL TOOLS

BENDING BRAKES

20 GA.
18 GA.
16 GA.*
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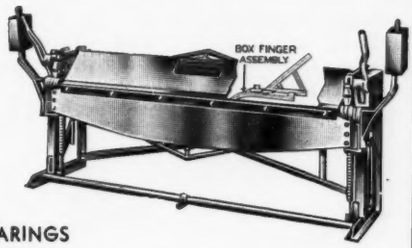
12 GA.*



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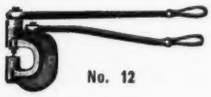
For your Brake requirements, consider the Whitney-Jensen line, favorite of the leaders! Five styles, 20 sizes, plain, combination, and portable types. Roller bearings, an outstanding Whitney-Jensen feature, give 40% more production and are 20% easier on the operator! Write today, or see your dealer . . .

No. 10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BALL BEARING

No. 20

Greatest punching power with lightest weight! Eleven different sizes of Whitney-Jensen Punches have the powerful, screw-press construction, and many others are made with roller bearing lever or toggle action. For most sheet metal fabrication, and light construction work, punching offers great savings over drilling. Investigate today!

WHITNEY METAL TOOL CO. • 91 Forbes Street, Rockford, Illinois

No "Service" Problem Here!

new, improved

MASTER HEAT REGULATOR

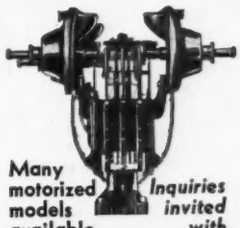
Simplicity of design and sturdiness of construction guarantee dependability!

Tough is the word for the new, improved Master Heat Regulator! Designed and constructed to withstand many times the strain and wear it will receive in normal service. Only materials that insure sturdiness and accuracy are used in its manufacture. Our engineers have devoted more than 20 years of painstaking research to make the Master Heat Regulator the finest in its price class. Offers many *exclusive* features not found in other makes at comparable prices. A product of WHITE MANUFACTURING CO., 2362 University Avenue, St. Paul, Minn., makers of scientific temperature controls.

"BUILT TO OUTLAST ANY HEATING PLANT"

BE SURE TO SPECIFY

The Best Rivets You Can Buy



Many motorized models available in single stroke and multiple drive

Inquiries invited with samples of work you wish to do

The word BEST is applied to T R & S rivets and automatic setting machines as recognition of adherence to the manufacture of a quality product as close to perfection as skill, inspection and processes of manufacture can produce—100% usable, accurately gauged rivets made by the world's oldest and largest Tubular and Split Rivet factory.

TUBULAR RIVET & STUD CO.

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REPAIR PARTS

FOR ANY STOVE OR FURNACE

The stock of repair parts at Peninsular is the last word in quality and accuracy. Parts to fit any Furnace, Boiler, Stove or Air Conditioning equipment can be supplied at a moment's notice.

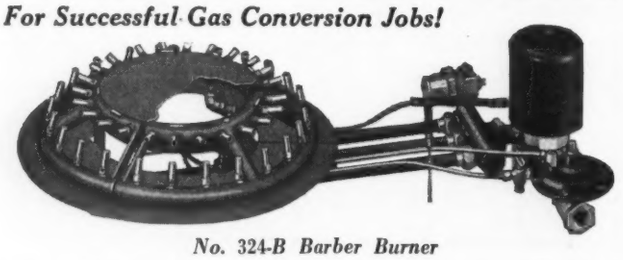
Why not order your next repair part from Peninsular? You'll be surprised at the speed and efficient service you receive.

Write us today for catalog.

PENINSULAR STOVE COMPANY
2699 Gratiot Ave. Detroit, Mich.

BARBER BURNERS

For Successful Gas Conversion Jobs!



No. 324-B Barber Burner

No other burner has the superb combustion efficiency of the famous Barber Jet. Barber Burners deliver 1900° flame temperature on atmospheric pressure, literally scouring the heating surface with a *direct action* flame, intense and perfectly controlled—without wasting precious B.T.U.'s on intermediate refractory elements. That's logical, isn't it? That's why they generate more *resultful* heat at lower fuel cost. And that's why they generate sales appeal, sound customer relations, freedom from servicing—all GOOD BUSINESS for YOU!

Listed in A. G. A. Directory of Approved Appliances. A wide range of sizes for both round and oblong furnaces and boilers, all properly adjustable to grate dimensions. Write for catalog and prices on Conversion Burners, Appliance Burners and Regulators.

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BARBER *Automatic* JET GAS BURNERS
for Furnaces, Boilers and Appliances

NO MORE
WALL-STREAKING
If you use the

GALE "Seal-Tite" Register

Wouldn't it be a relief to find a register that is completely and permanently streak-proof from the day it is installed? That's EXACTLY what the Gale "Seal-Tite" will do for you, with its flexible packing member. Requires no sealing frames when roughing-in. It's also good-looking—efficient—high quality at a LOW PRICE.

YOUR JOBBER CAN SUPPLY YOU
with a complete line of sizes—or write us direct for catalog.

We also make GALE "Pre-Fabricated" Ducts and Fittings

CHAR-GALE MFG. CO. 3125 HIAWATHA AVE. MINNEAPOLIS, MINN.

Heat Robber Problem

(*Continued from page* 39)

hand, I don't think it's really good business to recommend a blower where common horse sense and experience indicate that the trouble can be taken care of in some such manner as suggested.

There are plenty of jobs where blowers really ARE needed, and if all such plants were converted from gravity to mechanical circulation, there aren't enough blower factories in the country to even begin to meet the demand.

G. A. Voorhees.

◆

Insulation—

(*Continued from page* 54)

types of reflective insulation, having higher values of emissivity coefficient than those for aluminum, will not be as good as those indicated in Figs. 3 and 4. It should be noted that the relative insulating value of foil types of insulation may be greater when such insulation is placed in a horizontal position, such as in the ceiling joists, than when it is placed in a vertical position, as in sidewalls. The comparisons shown in Figs. 3 and 4, therefore, apply specifically to sidewall insulation.

[To be continued]

◆

Welding of Galvanized Iron

(*Continued from page* 67)

The fabricator has the option of using any of the other joints illustrated if the extra operation of offsetting is economically out of the question on contract work. In such cases, it may be necessary to use a straight lap. To employ this type, it is only necessary to be sure to tack weld the edges together with the carbon arc every few inches before actually beginning to weld. This makes the welding easier and prevents the seams from opening up.

◆

Plant Additions

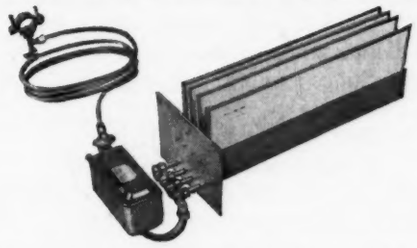
A new sheet metal shop is being erected at 1014 East Artesia boulevard, Bellflower, Cal., for A. T. LeMelle. It will cover an area of 22x55 feet and will cost $1,000.

◆

Shop Active This Summer

Birmingham Furnace and Roofing Co., 825 Seventh Ave., Birmingham, Ala., had a busy summer trade on furnace cleaning preparatory to autumn, also a large roofing trade. It is one of the foremost sheet metal shops in the south. Intricate and difficult work in sheet metal and copper has its attention. The firm manufactured the sheet metal letters in use on the Plaza Stores, Highland Ave. and 22nd street. The company has also done a large amount of cornice and canopy work this season.

THE MAID-O'-MIST
"CONVECTOR"
Sets NEW Standards in Humidifier Efficiency



For forced or gravity circulation. Offers continuous quick evaporating even at low temperature. Consists of two or four copper troughs 1/4" wide and spaced 1" apart. Patented metal-edged, replaceable evaporators six inches high are of special absorbent material and corrugated. Troughs are mounted securely on a flat hood plate 5" wide x 8" high which fastens on the plenum chamber wall with metal screws. Rear end of humidifier is supported by a truss brace which extends to the top of the front plate. Water Feeder is of brass, copper and Monel metal, with all parts, including copper float, nickel plated. Convector Humidifier is available in eight sizes. The smallest size has evaporating capacity of 25 lbs. of water per day at 130°. The largest size has a maximum evaporating capacity of 225 lbs. per day at 230° on gravity circulation.

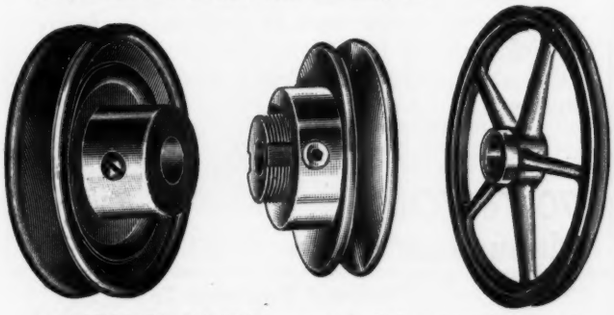
Send Today for CATALOG A-10 with Specifications and Prices.

MAID-O'-MIST, Inc.
180 N. Wacker Drive, Chicago, Ill.

Bring Your F. H. P. Transmission Problems to

MAUREY

MAUREY Pulleys are designed and made by engineers who are thoroughly familiar with the many applications for V-Pulleys. They have an enviable reputation for sturdy dependability under the severest tests and daily use.



MAUREY STEEL PULLEYS are not the light stamped type with die cast hubs that cause constant replacement of belts. They are made of heavy steel sections with heavy rolled edges and hubs machined from bar steel or malleable iron. That is the reason MAUREY Steel Pulleys give long, trouble-free service in installations of Stokers, Fans, Blowers, Air Conditioning and Refrigeration units.

VARIABLE PITCH PULLEYS of solid steel construction. Speed adjustment of as much as 30%. Fine, accurate milled threads, 20 to the inch assure close adjustment. For Air Conditioning Units. Made in 4 sizes—3 1/4" to 4 1/2" O. D.

MAUREY CAST IRON PULLEYS are made on a new principle of design that permits a freer flow of air through spokes. They are much sturdier than cast iron pulleys of the usual design.

WRITE FOR CIRCULARS AND PRICES

MAUREY MANUFACTURING CORP.
Wabash at 29th, Chicago, Illinois

"WITH WILLIAMSON WE HAD OUR BIGGEST YEAR"

"The Williamson Heater Company,
Cincinnati, Ohio.
Gentlemen:

1938 was the biggest year of our small company, which we started in 1935.

We attribute our success to the superior quality of merchandise which the Williamson Heater Company furnishes to supply to our customers.

Your quality merchandise enabled us to have nine months of installation.

Also, the very reasonable Finance Plan and the Summer Sales Plan stimulated business in the early months of the heating season.

Sincerely yours,
XYZ....., Ohio."

Complete information; name, address of writer of above letter furnished on request. Phone, wire or write The Williamson Heater Company or nearest jobber.

FREE: Complete, easily understood short method for figuring air-conditioning jobs. You can complete your figures, price job in one hour flat. Write Dept. 2.

THE WILLIAMSON HEATER COMPANY
Cincinnati, Ohio

WILLIAMSON
WARM AIR FURNACES

Everything You Need in

FURNACE REPAIRS

Repair parts to fit Furnace, Boiler, Stove or Air Conditioning Equipment, of any make or kind. Parts from Northwestern fit exactly, and of course are of the finest quality. Buying from Northwestern is your assurance of perfect merchandise the first time and all the time . . . of immediate shipment, and prices that are right. Investigate! Try your next order with Northwestern.

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Save Time on Forced Air Jobs With the Aid of This Practical Designing Manual

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FORCED AIR HEATING

215 Pages—6"x9"—clothbound—
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109 Illustrations
15 Charts
23 Formulas
19 Tables

Into this enlarged second edition has been put, in simple, readily understandable form, ALL the information the contractor needs to enable him to design any forced air heating system correctly and efficiently. It embodies all of the really worthwhile data on forced air heating that has been made available during the past several years, and shows by clear examples how to apply this knowledge properly in actual design work.

In designing a complete winter air conditioning system for a typical residence step by step, this practical manual outlines a model procedure of design, based on wide experience, which the contractor may follow with confidence on any of his own jobs. It also gives him a new data sheet, the use of which makes it impossible to overlook any factor in figuring the heat load, and shows in complete detail how to fill it in.

Every thought and device to make the new FORCED AIR HEATING a practical, everyday guide to correct procedure in forced air design work has been included in it.

Every contractor who is anxious to avoid mistakes and wasted time in forced air work should own a copy of this book. Send $1.00 today to the address below for your copy. You may order with the privilege of returning the book within ten days for a refund, if for any reason it should prove unsatisfactory.

CHAPTER HEADINGS

A Suggested Data Sheet, Procedure of Design, Sizing the Apparatus, Infiltration, Registers and Returns, Multiple Registers, Return Air Systems, Selecting Register Temperatures, Temperature Drop in Ducts, Mechanical Code for Forced Air Heating, Sizing Ducts by Friction Chart Method, Sizing Extra Long Runs, Pressure Losses, Velocities, Proportioning Losses in Heating Systems, Branch Take Offs, Volume Dampers, Bonnets and Plenums, Casing Baffling, Chimneys and Drafts, Air Conditioning Radiator Heated Houses, Automatic Control, Contract and Specifications, The Index.

KEENEY PUBLISHING COMPANY

6 North Michigan Ave., Chicago, Illinois

Konzo, Controls for Warm Air Heating Systems

(*Continued from page 57*)

If it is desired to stop the fan when the temperature of the heated air, (b), is lower than, say, 100 deg. F., a low limit bonnet thermostat may be incorporated in the fan circuit. Unless such a low limit bonnet thermostat is used, the fan will operate continuously regardless of the temperature of the heated air, (b), and under some conditions may produce objectionable drafts in the living quarters.

If the duct thermostat, (e), is set at 135 deg. F., then for all temperatures of the heated air, (b), greater than 135 deg. F. the damper (d) should be partially closed and the damper (c) should be partially opened.

Comparison of Two Systems

Since the maximum temperature of the duct air temperature, (e), is limited to 135 deg. F., the rise in room air temperature after the room thermostat demands heat will not be as rapid as in the control system shown in Fig. 2. On the other hand the overrun in room air temperature will be smaller, and smaller fluctuations in room air temperatures should be obtained. Hence the control system shown in Fig. 3 should provide better regulation of the room air temperatures than the control system shown in Fig. 2.

Aside from the fact that the control system shown in Fig. 3 is more complicated than that shown in Fig. 2, in general the advantages, limitations, and requirements listed under the latter control apply fairly well to the former control.

In large forced air heating systems continuous, high-speed fan operation is being used more and more extensively. These notes should indicate the possibilities as well as the limitations in controlling such systems to provide the minimum amount of fluctuations in the temperatures of the room air and bonnet. In the following issue the discussion will be extended to include automatic controls of intermittently operated fan systems.

◆

70-Year Old Monument

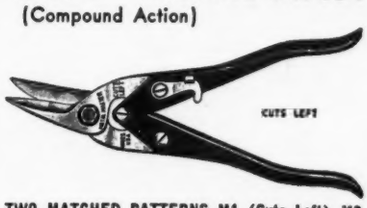
(*Continued from page 76*)

the wealth of intricate detail in the parts of the monument. It is likely that when the monument was built, there were no standard stampings and that every piece was patiently hammered out by hand. The full picture shows that each of the four sides is different from all others. The closeup pictures show some of the intricate work.

Originally, Mr. Baker believes, the pieces were assembled on an iron framework, and at some later date parts of the base were filled with concrete. Years of exposure without maintenance have opened several of the seams; some of the metal has rusted completely through, but most of the monument still stands in better-than-fair condition.

WISS "METAL-MASTER" SNIPS

(Compound Action)



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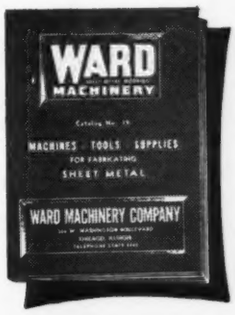
TWO MATCHED PATTERNS M1 (Cuts Left) M2 (Cuts Right) Cut circles, squares and any irregular patterns on Stainless, Dural and Monel Metals with the greatest of ease. Jaws of wear-resisting Manganese Molybdenum Steel. Handles hot-pressed from tough Chrome Vanadium Steel. Nickel steel bolts and nuts to Government specifications. All parts interchangeable. Detachable rubber handle grips at slight extra cost.

J. WISS & SONS CO.

ESTABLISHED 1848 NEWARK, N. J.



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Devoted entirely to machines, tools and supplies for fabricating sheet metals exclusively. If not write us today.

WARD MACHINERY CO.

564 W. Washington Blvd., Chicago, Illinois

BUY THE GENUINE SPEEDWAY 1/2" DRILL

AND GET THESE FEATURES

At The Lowest Price Ever Made On A Quality Drill Of This Size

- High Torque SpeedWay Drill Motor
- Streamlined Air Cooled Die Cast Case
- Natural Grip Direct Thrust Breast Plate Handle
- Removable Side Handle for Close Quarters
- Self Aligning Oilless Bearings
- 500 R.P.M. Operating Speed
- Smooth Sliding Thumb Switch
- Permanently Beautiful 2-Tone Finish

Complete with hand operated 3-jaw 1/2" chuck, rubber covered cord, unbreakable plug.

This SpeedWay No. 89 drill is the result of 30 years of specialization in the manufacture of portable tools.

Write for Circulars and name of nearest dealer.

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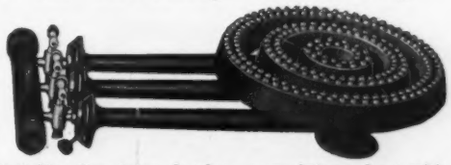

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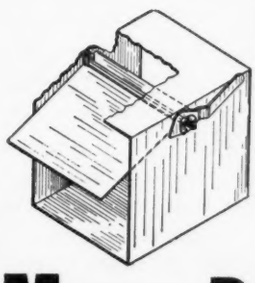

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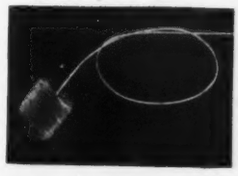

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Neubecker Pattern For Bay Window Roof

(*Continued from page* 70)

them off as shown by 5°-6 and 7 in the pattern for segment *II* and draw a line from 5 to 7, being the cut against the wall 5-7 in plan. Then will 7-5-1^{x}-1° be the one half net pattern for segment *II*, shown in plan by 5-7-1^{v}-1.

In this manner all of the segments indicated by *III-IV* and *V* in the section, are laid out. As previously mentioned, if more flares are used the quadrant or quarter circle in section will almost be perfect. If less flares are used "raising" must be resorted to. As mentioned in connection with "gore" construction this entire dome, using segments, can be completed in the shop. Allow laps for soldering or riveting as shown in the diagram in Fig. 2 marked "OFFSET LAP JOINT."

Radii Too Long to Handle

In laying out the flaring or segment patterns some will have such long radii that they will be impossible or impractical to use. When the radii becomes too long the patterns can be laid out to one and one half or three inches scale on paper and then enlarged to full size as will be described in connection with the diagram below the elevation in Fig. 3.

Any pattern drawn to a scale of 1½ in. to the foot would be one-eighth full size, while a pattern drawn to a 3 in. scale would be one-quarter full size. Let us assume that the dome in question has been drawn to a scale of 1½ in. to the foot as shown in Fig. 3 and that all of the segment patterns have been developed on paper to similar scale.

Enlarging Scaled Patterns

Now to enlarge these scaled patterns to full size simply multiply by 8, because 1½ in. scale is one-eighth full size. For example: To enlarge pattern for segment *II*, take a reproduction of 7-1°-1^{x}-5 and place it in the position shown by 7-1°-1^{x}-5 in the diagram below, being careful to have the center line 1°-1^{x} on a horizontal or perpendicular line (in this case horizontal as shown). Now extend the line 1°-1^{x} as shown by 1°-*i*. At right angles to 1°-*i* draw a line through 5 as shown by *i-j* and from 7 draw a line parallel to 1°-*i* to meet the line *i-j* at *j*.

At right angles to *i-j* through points 2-3-4-5° and 6 draw lines as shown extending them to meet the outer arc as indicated. The full size segment pattern can now be laid out direct on the metal sheet without using any radii. Scribe a line on the metal sheet 8 times the distance of *i-j* upon which set off 8 times the distance of each division shown on *i-j*. From these points erect perpendicular lines, making each one equal to 8 times the distance of similar divisions on the scale drawing.

In this manner the full size pattern is obtained. Of course this must be done for each segment from *I* to *V* inclusive. For a first class job, the segments should be "raised" using the proper size raising hammer on a lead block or on the trunk of a tree.

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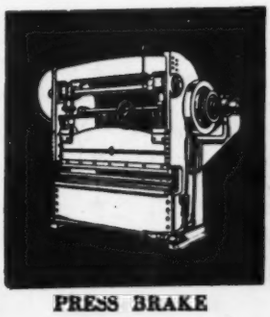

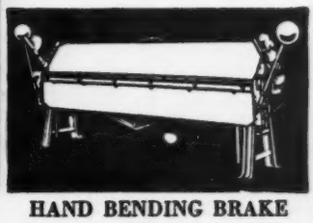

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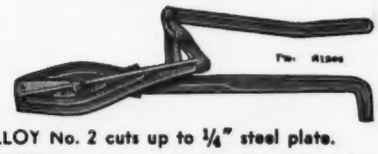

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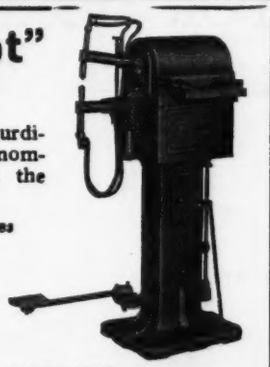

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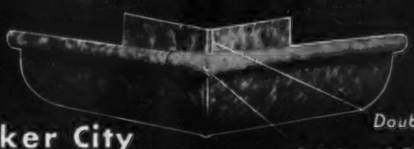

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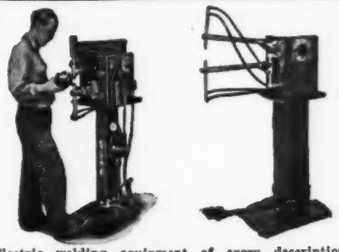

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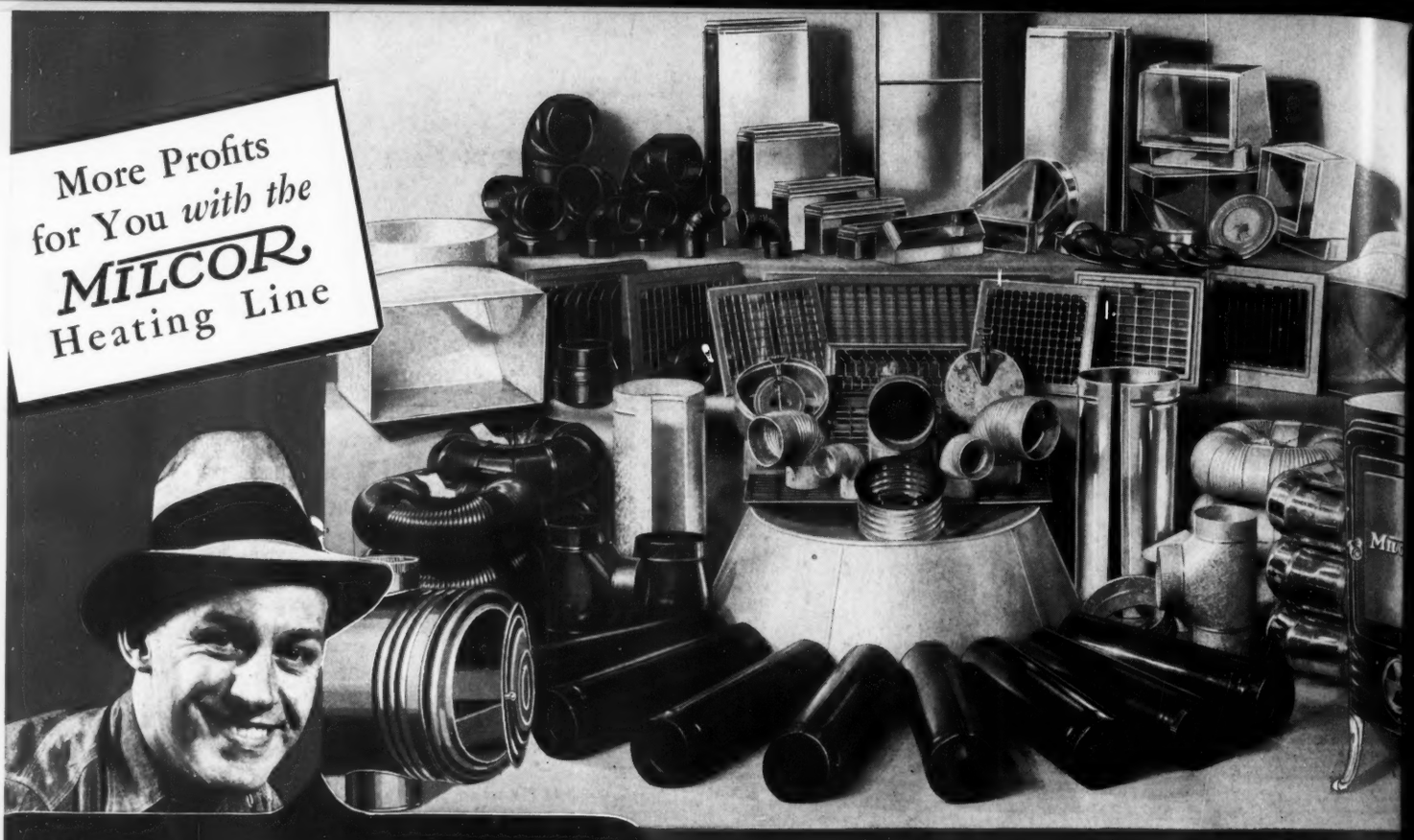

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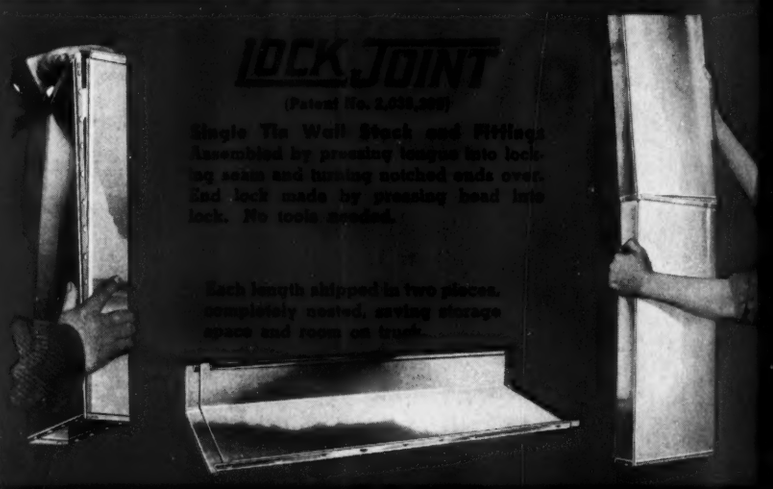
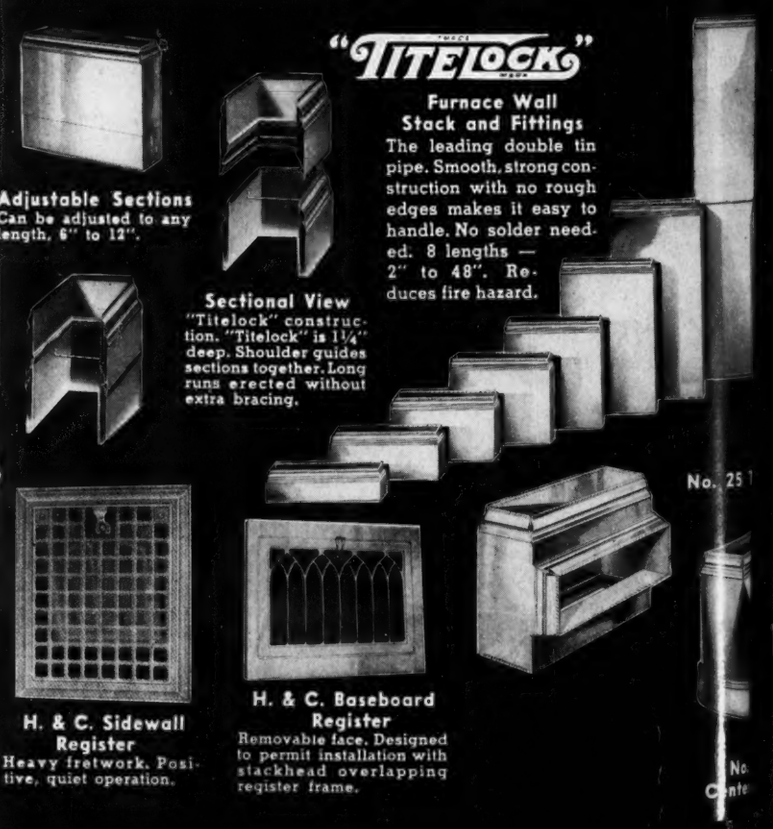
It's the big, complete line that sheet metal men have relied on for years

It pays you to do business with Milcor where you get everything in one place — and can depend on it to be *right.* • When you bump into a new problem in furnace pipe and fittings, the Milcor catalog is the first place to look. You're sure to find the answer — in the complete Milcor selection of types, weights, price ranges, etc. • This complete "family" of products is designed to meet virtually every condition in heating work. Milcor's unique features and wide assortment of accessories save time and trouble on the job . . . speed up your operation. All items in the line are engineered to work together. You give customers the kind of jobs they're looking for, and they're willing to recommend you to others as a man who knows his business. • Milcor not only makes everything you need, but gets it to you *when you need it.* • Successful sheet metal men everywhere are cashing in with Milcor Furnace Pipe and Fittings. So can you. Start using it on your next job. • Write today for the Milcor Price List and Catalog. H-19

Warm air Units of the complete MILCOR Heating Line





Adjustable Sections
Can be adjusted to any length, 6" to 12".

Sectional View
"Titelock" construction. "Titelock" is 1¼" deep. Shoulder guides sections together. Long runs erected without extra bracing.

Furnace Wall Stack and Fittings
The leading double tin pipe. Smooth, strong construction with no rough edges makes it easy to handle. No solder needed. 8 lengths — 2" to 48". Reduces fire hazard.

H. & C. Sidewall Register
Heavy fretwork. Positive, quiet operation.

H. & C. Baseboard Register
Removable face. Designed to permit installation with stackhead overlapping register frame.

MILCOR STEEL COMPANY
MILWAUKEE, WISCONSIN — CANTON, OHIO
CHICAGO, ILL., KANSAS CITY, MO., LA CROSSE, WIS., NEW YORK, N.Y.
ROCHESTER, N.Y., BALTIMORE, MD., ATLANTA, GA.
Also Milcor Minneapolis, Minn., Little Rock, Ark., Dallas, Tex., Denver, Col., Washington, D. C., Boston, Mass.